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LAUDANUM ASSAY.

By Lyman F. Kebler, Ph.C., B.S.

In an article[1] on this subject, by Mr. F. X. Moerk, it was stated that objections were frequently made to the pharmacopœial method on account of its general non-applicability to the various opium preparations. Vital as this is, yet there confronts those of us who are required to assay the various opium preparations for final standardizing a greater difficulty.

The general testimony of different workers[2] is that the U. S. P. method is from ·8 to 2 per cent. below the truth. The process above referred to is a modification of the U. S. P. process, but does not provide any remedy for the low results. The questions arise, shall or can we use the U. S. P. method for standardizing our opium preparations in these days of competition, or shall we use a method that gives higher results and is nearer the truth? Fortunately for us, unfortunately for the practitioner and the consumer, the legally recognized authority does not require us to standardize the finished products of opium, only the initial opium requires this.

Take for example a practical case: required to standardize 20 gallons of laudanum so that each ounce shall contain 6 grains of morphine. Assay by U. S. P. method, modified by Mr. Moerk, gives 1·28 per cent. Assay by a modification of Dr. Squibb's process gives 1·455 per cent. In the first case we are compelled to evaporate 5 pints and 10 ounces in order to secure the desired

[1] 1892, Am. J. Phar., **64**, 354.

[2] 1888, Ephemeris, **3**, 1113–1128.

standard and obtain only 19 gallons 2 pints and 6 ounces of finished product. According to the second assay it is only necessary to add 2 gallons of the proper menstruum and we have 22 gallons of finished product, a difference of 2 gallons 5 pints and 10 ounces, according to the process employed. With laudanum at $6 per gallon we would receive $16.20 more or less, according to the process employed, for the same product.

The process naturally chosen by the manufacturer is the one that yields the best returns on the money invested, both being legitimate.

The writer has, for some time, used a modification of Dr. Squibb's process[1] (which is principally a modification of Prof. F. A. Flückiger's original[2] design and plan) and this has given him more satisfactory results, with less attention, than any other method in literature tried by him.

For example, quadruple assays of a sample of laudanum, prepared according to the U. S. P. formula, gave the following results:

1	2	3	4	Mean.
1·20 p.c.	1·19 p.c.	1·16 p.c.	1·22 p.c.	1·192 p.c.

Again, a sample of tincture of opium, prepared approximately and subsequently standardized by assay in quadruples, gave the following data:

1	2	3	4	Mean.
1·405 p.c.	1·305 p.c.	1·360 p.c.	1·345 p.c.	1·354 p.c.

The purity of the crystallized morphine was verified by testing a small portion with lime water, in which the alkaloid is completely soluble while the foreign matter is insoluble and subsides to the bottom of the containing vessel when set aside a few minutes; if more than a perceptible residue remained, the percentage of insoluble matter was estimated according to Dr. Squibb's outlines.[3] "·5 gram is weighed off, put into a graduated cylinder and 50 cc. of lime water is added, by pouring down the side of the inclined cylinder. The contents of the cylinder are then tilted backward and forward without shaking, so as to avoid the formation of froth

[1] 1889, Ephemeris, **3,** 1150–1164.

[2] 1879, Pharm. Zeitung, 431; Abstr., 1882, Ephemeris, **1,** 10, modified 1885, Arch. der Pharm. (3), **26,** 254 and 289.

[3] Ephemeris, **3,** 1158.

on the surface, until all that is soluble is dissolved. The solution is then filtered through a pair of counter-balanced filters about 7 cm. or 2·8 inches in diameter, the filters and residue are well washed first with 5 cc. of lime water and then with 5 cc. of water, and when drained they are closed up, pressed between folds of bibulous paper, dried until they cease to lose weight at 100° C., and weighed." From these data we can easily calculate the percentage of insoluble matter.

The method used by the writer for laudanum assay is as follows: Place 100 cc. of the laudanum to be assayed into a tared capsule of about 250 cc. capacity, evaporate on the water-bath, occasionally stirring, until the contents of the capsule weighs about 20 gm., while yet warm add 80 cc. of cool distilled water slowly, stirring constantly. Allow the capsule and contents to stand until cool and the insoluble matter has completely subsided, then pour the clear liquid on a well-wetted filter of about 9 cm. diameter so folded that the lower part of the cone shall hang free from the sides of the funnel. The filtrate is received into a beaker marked at 135 cc. After the liquid has all been poured out of the capsule about 10 cc. of water are added and the residue removed from the sides and bottom of the capsule by means of a rubber tipped stirring rod and transferred to the filter, two similar subsequent treatments should suffice to remove everything from the capsule to the filter. If filtering is begun before the insoluble matter has subsided, it will be very tedious and unsatisfactory, for some of the finer particles are not retained by the filter until it is clogged. Wash the residue on the filter well with small portions of water, allowing each portion to drain completely before a subsequent addition is made, until the residue is exhausted and the filtrate measures about 135 cc. Place the filtrate into a tared capsule of about 250 cc. capacity and evaporate on the water-bath, stirring occasionally, until the filtrate is reduced to 14 gm.; while yet warm pour into a tared flask of 100 cc. capacity. The portion remaining in the capsule is transferred to the flask by successive rinsings of about 2 cc. of water and finally enough water is added to make the solution weigh 20 gm. The precipitating, separating, washing and drying is executed as is outlined in the Ephemeris except that the morphine is more thoroughly washed with water, so that the mother liquor and the washings measure 65 cc. instead of 50 cc.

It would be well, perhaps, to give verbatim the principal parts of the original article on "Precipitation," and "Separation and Washing," so as to make the process complete here.

"*Precipitation.*—To the 20 grams of concentrated solution is then added half its weight, or 10 grams of alcohol of not less than 91 p.c., s.g. ·815, and the mixture is well shaken. Then 25 cc. or 17·5 grams of ether[1] not less than 93 p.c., s.g. ·725, is added, and the mixture again well shaken. To this 3·5 grams or 3·5 cc. of water of ammonia of 10 p.c. strength, s.g. ·960, is added, and the mixture is vigorously shaken for 10 minutes." "At the end of the 10 minutes' shaking, the flask is set aside overnight, or for not less than 6 hours."

"*Separation and Washing.*—The ether layer is poured off as closely as possible, and 20 cc. of fresh ether is added to the contents of the flask, and rinsed round without shaking. This is poured off as closely as possible, and 20 cc. more of fresh ether added, rinsed round and poured off as before, and this is repeated with a third portion of 20 cc. of fresh ether. A pair of counterbalanced filters 9 cm. or 3·6 inches in diameter, folded at an angle slightly wider than the funnel, and well wetted with ether, then receive the contents of the flask, the upper ether layer being slowly poured in first, so that it may pass through before the paper becomes wetted with the watery solution. When the liquid has nearly drained through from the crystals on the filters, those from the flask are washed out onto the filters by repeated portions of water, about 3 cc. at a time, until all the crystals are on the filters. Then water is applied, drop by drop, from a pipette held 3 or 4 inches above the funnel, to the edges of the filters and surface of the crystals, until they are fairly clean, and the mother liquor and washings together do not exceed 50 cc. Then 5 cc. of a saturated solution of morphine in 91 per cent. alcohol is dropped from a pipette, first upon the crystals on the point of the filters and then upon the edges of the filters, so as to displace all the watery solution and leave them saturated with the alcoholic liquid. Then before this has time to dry, it is displaced by dropping on, in the same way, 5 cc. or more of ether. When this has drained through, the filters are closed together upon

[1] Prollius was the first to use ether for this purpose, 1877, Schweiz. Wochensch. f. Pharm., 381; Pharm. Zeitung; Draggendorff's Jahresberichte.

the crystals, in the original folds, and pressed between folds of bibulous paper, under weights, for half an hour. The filters are then opened, and when the morphine is spread out upon the inner one, they are dried at 60° C. or 140° F. until they cease to lose weight. This is the crude morphine, and if a small portion of it is found to be entirely and quickly soluble in one hundred times (or more) its weight of lime water, the weight of the morphine multiplied by 10 is accepted as the percentage of morphine yielded by the laudanum."—Laboratory Smith, Kline & French Company, Philadelphia.

ON THE PREPARATION OF COMPRESSED TABLETS.

By J. A. McFerran, M.D.

Read at the Pharmaceutical Meeting, Philadelphia College of Pharmacy, April 25.

Prescriptions are a matter of confidence between the druggist and physician, and no measure of compliments can do away with the responsibilities of either toward the sick. Both should be thoroughly competent to do their duties in a practical way. Neither can delegate to others any part of their duties; both have noble callings, and there should be as much conscience on the part of the compounder of medicines as on that of the prescriber. Medicines are, to a large extent, the means used by the physician to meet the onset of disease. The physician chooses the remedies and trusts to the druggist to prepare them. In these progressive times the physician too often forgets the great purposes of his profession by giving importance to manufacturers' compounds; and the druggist eager for trade lowèrs himself to localized venders of ready-made prescriptions. This state of affairs, the druggist says, has been brought by the physician; and the doctor says the fault rests with the druggist in not keeping up with the demands of practical pharmacy. I think the trouble is somewhat with both; the doctor is often too indolent to think, and the druggist too lazy to work. The doctor prescribes pills of valerianate of zinc, granules of strychnine, elixir of quinine, iron and strychnine, and an innumerable multitude of other ready-made compounds. The druggist buys his extracts, tinctures, confections, and pills, and lozenges, from the manufacturing chemist, labels them with his own label, and calls his place a pharmacy. In neither case is the patient getting what he pays for, the best thought of his physician or medicine compounded by the

druggist, in whose skill he places his health's safety. I am free to say, I have no faith in the skill of the doctor who prefers the prescriptions of others to his own; or in the ability of the druggist who depends upon others for the products that legitimately belong to his pharmaceutical calling.

There is one form in which medicine is very frequently used at the present time, that gives the retail druggist ample opportunity to show his individual skill and meet the many demands of his customers without resorting to the products of others: I mean compressed tablets.

The enterprising manufacturers not only will furnish them direct to the physician, but will solicit orders also from the druggist. No pent-up Utica is theirs, the whole boundless domain of physics is embraced in their all-absorbing love. Nor will the doctor, prone to the easy paths in the practice of medicine, stop his ears to the seductive arguments of the travelling salesman. The manufacturer sees the opening for trade, the retail druggist trys to ignore it; but it is useless; the doctors want compressed goods, and if they cannot get them from the retail druggist first-handed, they will get them where they can. It is useless to say that they are not used, or that they cannot be made by the retail druggist. They are used, and the retail druggist can furnish them in a better condition for administration than is often done by the manufacturer. The druggist can fill a doctor's *own* prescription, leaving the doctor no excuse for using that of others. He can make them hard or pliable, to suit the wants of the physician. By this means, the patient, the doctor and the druggist are brought nearer together, between whom there should be mutual confidence. It is urged by many druggists that they can buy tablets at a lower price than they can make them. This is not so for goods of the best quality; further, there are some compressed goods which are popular as domestic remedies, which change in appearance by keeping long, if made properly. For instance, soda mint tablets, such as are usually put on the market, if they have the full amount of oil in them and ammonia they will turn yellow; if they have not they are of but little use, and the buyer is disappointed or cheated. A druggist could make up a small quantity at a time and have them *fresh*; customers always want things fresh.

Soda mint is very easily made. Mix 1 lb. of bicarbonate of soda, gum arabic 1 ounce, oil of peppermint ʒiii, and carbonate of

ammonia ʒi; dampen with alcohol and water, run through a No. XX sieve and dry. Make into 5-grain tablets, and sell them to your customers as the best in the market; for they are of your own make. These will be what they profess to be, and your patrons will soon find it out.

If you understand the principles of pharmacy, you can soon learn how to make compressed tablets, and learning how, you will become better druggists. Of course, as graduates you know the chemical relation of drugs, how and when chemical reactions take place; this will serve a good purpose here. For some time past there have been used many tablets of calomel and bicarbonate of soda. Your chemistry will tell you if these salts be mixed wet, and granulated, decomposition will take place, and the question would be, how to avoid it? You might do so in several ways; but I will mention only one. Take bicarbonate of soda ʒxss, gum arabic ʒss, mix and dampen with water, run through a No. 40 sieve, dry and put into a bottle, add calomel ʒiss, and shake this until every granule is coated. The calomel will adhere to the small particles of soda hardened with the gum; this will obviate any necessity of talc. The object is to prevent the soda and calomel coming together in a damp condition. Make up into one-grain tablets, each of which will contain $\frac{1}{12}$ of a grain of calomel This illustrates pretty well how chemical incompatibles may be put together in a compressed form and still retain their individuality, and still better how, in some cases, a dangerous result may be avoided from mixing together articles innocent in themselves, but deleterious as factors in a product. The soda hardened with the gum is scarcely, in the least, hygroscopic and the tablets made with it, in the manner stated, will keep without change fully as long as a druggist who has them for sale desires. The calomel, being put in last, answers the purpose of its indications as a medicine, and, at the same time as a protection against adhesion to the dies and punches. In all these combinations a certain amount of brains is a *sine qua non*, and may be written on the formula *quantum sufficit*. Here, as elsewhere, the dictum of the teacher cannot give individual skill, nor can the dreams of theory take the place of applied knowledge.

At the start remember, and never let it be forgotten, that facts established cannot be changed, and it is with facts you have to deal. The metal of which the dies and punches are made is a fixed,

unalterable fact. You may change the form, the peculiar construction of the punches or die; but so long as the face of them presents a smooth surface to the material to be compressed, it is always the same. Remembering this, you will not ascribe the fault to the die or punch, if your material adheres to them. The punch should be perfectly smooth and have sharp edges, and move freely in the dies. They should be made of tool steel and tempered just hard enough to prevent bending under pressure—beyond this you should expect nothing, and if the material adheres to them, you must look to the material as the thing at fault. As a rule, you should cause the cohesive property of the material to be greater than the adhesive, and when, by experiment, you find where the fault is, all that you have to do is to apply your knowledge of the nature of the different excipients to correct it. There are some materials that are neither cohesive nor adhesive; for instance, if an ounce of pulverized charcoal were ordered to be made into 40 lozenges, you would have no trouble in their sticking to the dies and punches, but you would have a great deal in getting any cohesion between the different particles of the material. The question here would be to add something that would cause a cohesion greater than adhesion, and, at the same time, not destroy the effect of the charcoal as a remedy. Here dextrin, wax, gelatin, gum arabic and tragacanth, mastich, etc., present themselves, as the different particles of the charcoal must actually be glued together.

If you were ordered to make 480 grains of salicylate of soda into 96 tablets, you might add some pulv. acacia, dampen with alcohol and water, run through a No. XXX sieve and dry. Just before using, stir in some talc to prevent sticking. There are other ways, without the use of talc, but it is better to learn this way first.

The coal oil products will claim your attention very often. Most of them are not soluble in water, and when pressed alone may prove useless on account of their insolubility. A small quantity of starch added to the mixture may often become of great service. Say you take salol, phenacetin, starch; dampen with alcohol, run through a No. XX sieve, shake over a gas jet to slightly warm, to granulate and dry; a moderate heat assists in granulating. There is no need of anything to prevent sticking.

There is a point that it is well to remember: Any liquid that is not a solvent to any of the ingredients in a compound, will act as a

protection against adhesion to the dies. In the manufacture of refined naphthalin into tablets, the material will stick to the dies if something is not used to prevent. As naphthalin is not soluble in water, water should be used to dampen, and this is effectual against adhesion.

In making tablet triturates, you will find sugar of milk alone makes the tablets too brittle; to correct this, add about one part in 8 of cane sugar as the base, dampen with alcohol and make up damp, unless they contain extracts; in that case you would have to make up dry and use talc to prevent sticking. The talc should always be stirred in after the material has been granulated and dried. Where talc is objectionable, white cosmoline or albolin can be used pretty freely, if you have a machine that will feed a damp and sluggish material. By putting the tablets into some absorbent powder after they are made and applying heat, most of it will disappear.

Learn the nature of each article that you wish to compress, and take advantage of your knowledge of the solubility in different menstrua, and when the contrary nature of the different articles in a combination precludes the use of this knowledge, fall back upon such correctives as experience and your own thoughts suggest to meet the particular case. In making up compounds, reduce all to a fine powder as far as practicable; in this way you will make more regular granulations and finer looking tablets. Take the familiar brown mixture: Gum and licorice, each 2 lbs.; opium, 219 grs.; benzoic acid, 219 grs.; camphor, 140 grs.; oil of anise, 219 grs.; tartar emetic, 110 grs.; nitrate of potash, 1,750 grs.; sugar, sufficient for 10 lbs. If these be thoroughly mixed and ground to a fine powder, put into a wide receiver, and hang a wet sponge to the under side of a lid; the material will absorb enough moisture to dampen during one night; next morning run through a No. XXX sieve and dry; on account of the extracts and sugar you cannot do without talc or lycopodium to prevent sticking. If you prefer, you can use diluted alcohol and dampen with a hand atomizer.

In filling prescriptions of small quantities, there is often no need of elaborate work in granulating; sometimes, when not incompatible powdered soap rubbed up with the articles ordered prepares them to be run through a sieve; simply dampening with ether, puts a powder into a granular condition. And where running out a

pound might require something to prevent sticking, 10 to 20 tablets would require nothing. Wetting with alcohol and drying will almost always leave the mass grainy. It does not matter how fine your material is, all you want is that it will tumble and not hold together on account of the moisture in it. I might talk for a week about material; but I wish to say something about how to make the tablets.

In the first place, do not get the fidgets, see that everything is in place and that your machine is clean. Choose the set of dies required; and in this machine designed especially for retail druggists, you will find by lifting a small shaft and removing a pin, you can take off the feeder. Turning a few turns on this thumb screw you can pull out the die holder; while this is out you can see if the internal part of the machine is clean. The die holder being out, put in a top punch of the size you wish, put the die into the die holder, insert the bottom punch, put in the die holder with its containing die and punch, fasten into place by turning thumb screw, slip on the feeder, drop the small vertical shaft into place, and you are ready for work. Weigh out the quantity of one tablet, pour it into the die and screw up the bottom punch until the material comes even with the plate. Turn on the pressure, and when the top punch is at its lowest depth, turn the knob at the top of the eccentric strap until you feel the pressure. Make 2 or 3 tablets to see whether the weight is all right, then put on more pressure if necessary and finish your work. The first tablets should not be pressed much; when you are sure of your weight, you can powder the trial ones between your fingers and return to the feeder. The small cup should be used in making up small quantities. Put it in by taking off the top of the feeder and simply putting the cup in its place; the motion of the feeder, in going backward and forward, will cause the material to drop into the die; the remnant of one or two tablets can be brushed into the die and there is no need of wasting any material at all. The feeder is so constructed that there can be no leakage from beneath the feed. The lower punch is so constructed that there is the least amount of friction possible. One great fault in making tablets is in using too much pressure, running at the rate of 60 per minute, the pressure should scarcely be felt on small tablets; but by taking a tablet between the fingers a little experience will tell you whether to put on or take off pressure,

which is easily done by simply turning the knob to the right or left. In making tablets, whenever you hear a rubbing sound when the tablet is ejected you may know that the material needs correcting. As the feeder is so easily taken off, you can remove it with its contents without wasting a particle, correct the material by adding talc, or what else is needed; put it back and proceed. Do not undertake to make tablets too fast; a regular easy motion is the best, and you will accomplish more than by trying to do a great deal in a short time. I am sure this machine will do all that is required by a retail druggist, as well as it is possible for a machine to do it. It is strong, it takes up but little room, is easily kept clean and it is so simple that any one can understand it and run it. You can make quinine tablets, hypodermic tablets and such things as you wish to avoid excipients in; besides, by the constriction of the feeder you can make up the flat friable triturates faster and more regular than on plates, and that too without the use of talc or other insoluble excipients. The how to do those things does not properly belong to a short talk on tablets; any one wishing to learn can do so on a proper occasion.

Here are quinine tablets, made without gum, oil, starch or talc and other tablets of different sizes and shapes, made on a machine similar to this, which should be evidence conclusive that a retail druggist can make his own tablets and furnish physicians, who desire to think for themselves, any tablet that they wish to prescribe, without buying a hundred to fill a prescription of ten.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

A test for cineol (*eugenol*), suitable for its detection in volatile oils, was discovered by E. Hirschsohn in determining the solubility of iodol in volatile oils; it was noticed that iodol was much more soluble in some oils than in others, and that in some oils a crystalline deposit was obtained in varying periods of time (one minute to twenty-four hours). The oils first giving the test contain cineol as the chief constituent, according to the investigations of Wallach; this was confirmed by using chemically pure cineol when the same compound was produced; after pouring off the excessive oil from the crystals, the latter were thoroughly washed with petroleum-

ether, when a grayish green crystalline, odorless substance was obtained, rather soluble in alcohol (95 per cent.) and ether, but difficultly soluble in chloroform and benzol; the crystals boiled with aqueous alkaline hydrates were decomposed, giving the characteristic odor of cineol. This test is serviceable in the examination of mixtures containing hydrocarbons, like oil of turpentine; to dissolve one gram iodol, 100 cc. of turpentine oil are required; the addition of 5 per cent. cineol to the oil enables 58 cc. to dissolve the iodol, crystals separating after twenty-four hours' standing; if 10 per cent. cineol be present 48 cc. will be required, crystals separating after three hours. In applying the test from 3–15 drops of the oil were agitated with 0·01–0·05 gm. iodol. If necessary, more of the oil was added drop by drop until perfect solution resulted; the test was then set aside and examined frequently during twenty-four hours to see if crystals had separated, these then were tested for cineol by heating with potassium or sodium hydrate solution and noting the odor. All samples of the following oils readily gave the test: *Santonica, hyssop, Kuro-moji, laurel, lavandula vera, lavandula Spica, rosemary* and *sage;* in the following oils some anomalies are to be noted: *Absinth*, of German, French, Russian and American samples, only those of the first origin gave the test; *eucalyptus*, of a large number of samples examined only three failed to respond; *galangal*, two of three samples responded; *millefolium*, some Russian and German samples gave the test, but not uniformly; *origanum*, three of four samples yielded affirmative tests; *savory*, only one out of four samples responded; *wild thyme*, four of eight samples gave the test. By distilling the following oils (which themselves did not respond) with steam and applying the test to the first portions of the distillate the test was also obtained: *Basil, Mentha crispa* and *M. piperita* from all sources. This modification of the test may detect cineol in oils which directly tested will not respond; the nature of the crystalline compound has not as yet been ascertained.—Pharm. Ztschr. f. Russl., 1893, Nos. 4 and 5.

Syrup of Iodide of Iron, if made from sugar containing ultramarine, will uniformly assume the red color which has so frequently been commented upon; this coloration was never observed when rock candy was used in the preparation of the syrup.—J. Martenson (Pharm. Ztsch. f. Russl.), 1893, 100.

Hydrargyrum sozoiodolicum is recommended to be dissolved in

potassium iodide solution for hypodermic injections. F. Riederer always noticed a dark gray residue when making up the solution; this residue, amounting to about 0·5 per cent., was found to consist largely of metallic mercury, while the solution contained some red iodide of mercury. From this it is evident that potassium iodide solution cannot be used for the dissolving of the mercurial salt without decomposition.—Pharm. Ztsch. f. Russl., 1893, 101.

The use of crude carbolic acid and wood-tar, for disinfecting purposes, is rather wasteful because of their insolubility in water. E. Hirschsohn, in a series of experiments, found that if 100 parts of so-called 100 per cent. crude carbolic acid was agitated with 50 parts moderately finely powdered rosin and 6–8 parts sodium hydrate dissolved in 12–16 parts of water until solution resulted, a liquid was obtained giving an almost clear solution with ten volumes of water. The solution resembles "Lysol," differing from it, however, in not being miscible with petroleum-ether, and in not producing the gelatinous mass upon addition of two or three volumes of water. Experiments with so-called 50 per cent. crude carbolic acid did not give a preparation dissolving perfectly in water; using the same proportions as above, the preparation resembled "creolin," giving with water an emulsion.

In experimenting with wood-tar it was found that the same formula would not give satisfactory preparations with the different kinds of tar. While in the case of birch-tar the above proportions proved satisfactory, fir-tar required an entirely different formula. The best results were obtained by using 100 parts of fir-tar, 10 parts rosin and 6–7·5 parts sodium hydrate, dissolved in 12–15 parts of water. These preparations do not give entirely clear dilutions with water, but upon prolonged standing neither an oily nor tarry layer separates.

While heat is not essential for success it facilitates the solution of the rosin in the carbolic acid and tar; the sodium hydrate, however, must be dissolved in the specified quantities of water or inferior preparations will result. Attention is called to the fact that crude carbolic acid is met with which will give good preparations with less rosin and sodium hydrate. Other oils, like oil of turpentine and oil of eucalyptus, can be made miscible by following the above directions.—Pharm. Ztschr. f. Russl., 1893, Nos. 8 and 9.

Caffeine salts.—By direct combination with the acids, and drying

over quicklime or sulphuric acid, the following salts were made: *Nitrate* $C_8H_{10}N_4O_2HNO_3$; *acetate* $C_8H_{10}N_4O_2(HC_2H_3O_2)_2$; *propionate* $C_8H_{10}N_4O_2(HC_3H_5O_2)_2$; *citrate* $C_8H_{10}N_4O_2(H_3C_6H_5O_7)$ (this compound at 100° C. loses no weight, is soluble in a mixture of chloroform and alcohol and the alcoholic solution does not at once redden blue litmus paper. A mixture of caffeine and citric acid in molecular proportion at 100° C. loses about 8 per cent. water of crystallization, while it is soluble in a mixture of chloroform and alcohol, the alcoholic solution reacted acid at once). The *formate*, *butyrate* and *valerianate* could not be obtained containing the theoretical quantities of acid. The *acid sulphate* $C_8H_{10}N_4H_2SO_4$ was readily obtained from the alkaloid and sulphuric acid in alcoholic solution; exposed to the air for a few days the salt takes up one molecule of water. The *neutral sulphate* could not be obtained pure.—Prof. E. Schmidt and Dr. R. Gaze, Arch. der Pharm., 1893, 1–10.

Cerbera Odallum Gærtn.—A supply of seed kernels from the Dutch Indies furnished the material for the following investigation: They contained 6·94 per cent. moisture, 2·41 per cent. ash, and by extraction with ether about 77 per cent. fat; by expression with moderate heating about 44 per cent. could be obtained. The active constituent, cerberin, was isolated by first expressing as much as possible of the oil, digesting with several portions of 80 per cent. alcohol, distilling off the alcohol, adding water, separating the fat collecting upon the surface and repeatedly agitating the solution with petroleum ether. After standing for some time, a black layer subsided which was separated from the supernatant liquid, washed with petroleum ether, dissolved in alcohol and filtered through purified animal charcoal; by repeated crystallization from alcohol and washing with ether, perfectly white crystalline cerberin was obtained. By this washing with ether a substance was removed melting at 175–176° C. The yield of cerberin in the first lot extracted was 0·16 per cent., while later only 0 08 per cent. was realized. The kernels had between the two operations become perfectly black, so that partial decomposition of the cerberin is very probable. Cerberin forms colorless, odorless, anhydrous crystals, having a bitter taste, and melting at 191–192° with some decomposition; it is easily soluble in ethyl, butyl and amyl alcohols, chloroform and glacial acetic acid, difficultly soluble in ether and benzol, and almost insoluble in petroleum-ether and water. The ultimate analysis and molecular

weight determination indicate the formula $C_{27}H_{40}O_8$, agreeing with that obtained for *tanghinin* from Tanghinia venifera, Poir. Of tests for cerberin may be mentioned: (1) Yellow color upon heating with dilute mineral acids. (2) With concentrated sulphuric acid a transient orange red, after 15–30 minutes a violet color appears first around the edge of the liquid spreading throughout the liquid, finally passing into blue. (3) Concentrated sulphuric acid with phenols (thymol, *a*-naphthol, cresols or glycocholic acid), produces a red or violet coloration, while the acid with aldehydes (furfurol, saccharose, vanillin, heliotropin, etc.) produces blue colorations. By heating with a dilute alcoholic sulphuric acid, cerberin yields about 63 per cent. cerberetin, a reducing sugar (in very small amount), and very likely a third compound, since considerable loss was noticed and after separating the cerberetin poisonous physiological effects were still obtained. Cerberetin, a citron yellow amorphous powder, is soluble in alcohol, ether, benzol and chloroform, giving intensely yellow colored solutions, insoluble in water and petroleum-ether, it melts at 85·5°; with concentrated sulphuric acid at first a red color is produced changing to brown or violet, the acid with traces of aldehydes gives the same color as with cerberin; it has the formula $C_{19}H_{26}O_4$; and was found to be poisonous. A comparison of *cerberin*, *tanghinin* and *thevetin* (from Cerbera Thevetia, L.), indicate that they are not identical.

	Cerberin.	Tanghinin.	Thevetin.
Melting point, ...	192°	182°	170°
Solubility in water, . .	1 : 5555	1 : 20000	1 : 222
Formula, ...	$C_{27}H_{40}O_8$	$C_{27}H_{40}O_8$	$C_{54}H_{84}O_{24}.H_2O$
Decomposition products	yellow cerberetin $C_{19}H_{26}O_4$ and little sugar	yellow resin but no sugar	white theveresin $C_{48}H_{70}O_{17}$ and sugar

—Prof. P. C. Plugge, Arch. der Pharm., 1893, 10–34.

Sumatra Benzoin.—Professor Tschirch, during a visit to a benzoin tree plantation in Java, made the interesting observation that the trees contained neither secretion nor secretion-cells; in fact, that all parts of the tree were perfectly odorless and that only after wounding the tree did the balsam commence to exude. It follows, therefore, that the tree must contain some constituent, which, under the conditions alluded to, gives rise to benzoin balsam. An examination, having for its object the isolation of this constituent, was made possible, as Professor Tschirch brought with him some bark from

young trees, Styrax Benzoin, Dryand. To aid this examination authentic Sumatra benzoin was first investigated. Contrary to the published statements it was found that benzoin was entirely, although somewhat slowly, soluble in ether. By agitating this solution with 4 per cent. solution of soda until neutral reaction resulted, separating the ethereal layer and carefully evaporating it, an oily residue was obtained, in which traces of styrol, benzol and benzaldehyde, 2–3 per cent. styracin and about 1 per cent. phenylpropyl cinnamate were found. From the sodium hydrate solution, vanillin, benzoic and cinnamic acids and the three resins were isolated. γ-resin soluble in sodium carbonate solution; the part insoluble, treated with ether, was again separated, α-resin dissolving while β-resin remained insoluble. Prolonged boiling of α- and β-resins with sodium carbonate solution caused them to change into γ-resin; this again by boiling with potassium hydrate solution was decomposed, cinnamic acid and two alcohols resulting; white crystallizable *benzoresinol*, $C_{16}H_{26}O_4$ (present in small quantity only), and amorphous brown *resinotannol*, $C_{18}H_{20}O_4$. The three resins of previous investigators making up the larger part of benzoin, therefore are mixtures of the more or less decomposed esters of cinnamic acid with these two alcohols. Besides *free benzoic acid* there is also present a quantity of *free cinnamic acid*. The bark of the uninjured trees by analysis contained traces of wax, small quantities of phloroglucin and sugar and large quantities of a tannin easily oxidized to a phlobaphen (benzophlobaphen) having the formula $C_{51}H_{50}O_{21}$. As the uninjured bark contains neither secretion nor secretion-cells, but does contain large quantities of tannin, and as the balsam contains a large quantity of resinotannol (an alcohol reacting like a tannin) and the balsam formation first takes place in the parts of the bark containing the tannin, it is very probable that benzoin balsam is produced from the tannin of the bark.—Fritz Lüdy, Arch. der Pharm., 1893, 43-95.

Sumatra benzoin.—Professor E. Schmidt, supplemental to the previous article, gives some results of an elaborate examination made by C. Denner some years ago, but of which no complete statement ever appeared in print. He isolated free *benzoic* and *cinnamic acids*, *styrol*, *vanillin*, *benzaldehyde*, *styracin*, *benzyl cinnamate*, and *three so-called benzoresins*; the styrol and benzaldehyde were obtained in much larger quantity than by Lüdy so that they could be identified

by a number of chemical and physical tests.—Arch. der Pharm., 1893, 95–98.

Medicated glycerin suppositories.—Successful clinical experiments by Dr. Kohlstock in rectal applications of *aloin*, *colocynthin* and *citrullin* (colocynthidin) suggested a combination of these cathartics with the popular glycerin suppositories. These are made containing in each suppository either 0·5 gm. aloin, 0·03 gm. colocynthin or 0·02 gm. citrullin; of these the suppositories containing aloin are used in mild cases of constipation, those containing colocynthin in more serious cases, whilst those containing citrullin are recommended in case of failure of the others. Their action is stated to be reliable; prolonged use may require a small increase in the dose in order to maintain effectiveness.—Pharm. Post, 1893, 104.

Benzosol (benzoylguaiacol) has recently been claimed a successful remedy for diabetes; to ascertain the decrease of the sugar in the urine the polariscope was used. The urine of a person undergoing the benzosol treatment was found to be lævogyre and accordingly was pronounced free from sugar, but by the use of Fehling's solution and phenylhydrazine the urine was found to contain about 1 per cent. sugar. Experiments made by administering benzosol to non-diabetic persons proved that this remedy caused lævogyre rotation of the urine; hence, the indications of the polariscope are to be supplemented by other tests for sugar in urine.—Dr. A. Jolles, Pharm. Post, 1893, 101 and 114.

The solubility of iodoform in alcohol and ether, as stated in the various pharmacopœias showing considerable discrepancy, Dr. G. Vulpius redetermined these, finding that 67 parts of an alcohol of 90·5 per cent. by volume at 17° to 18° C. dissolved one part iodoform; at the boiling point only 9 parts of this alcohol were required; to dissolve one part iodoform 5·6 parts cold ether were needed.—Pharm. Centralhalle, 1893, 117.

The volatile acids in butter are expeditiously determined by a modification of Dr. Kreis' method; to 5 grams of the melted and filtered butter placed in a flask are added 10 cc. of concentrated sulphuric acid. The butter dissolves at once in the acid with liberation of sulphurous acid. After the solution becomes colorless and transparent 150 cc. water are added and then sufficient permanganate of potassium solution until the red color remains for a few

seconds. This causes the oxidation of sulphurous acid and eliminates the source of error in Kreis' method; 110 cc. are next distilled off and titrated as in the well-known Reichert-Meissl's method. —Dr. J. Pinette, Chemiker Ztg., 1893, 395.

Thiuret and its paraphenol sulphonate.—The first of these, $NC_6H_5CSH{\cdot}NH{\cdot}CSH{\cdot}NH$, a bulky, odorless, crystalline powder, insoluble in water, soluble in alcohol and ether, is offered as an antiseptic to be applied in the form of powder, its action depending upon the liberation of sulphur, cold dilute alkalies easily decomposing it. Of the salts which act more rapidly because of the greater solubility, the one mentioned above is the most suitable as it can be used as 0·3 or 0·4 per cent. aqueous solution. In the pure form it is a yellow, crystalline, odorless powder, having an intense bitter taste.—Pharm. Ztg., 1893, 137.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Estimation of nitrogen in the urine.—A. Petit and L. Monfet report to the Société de Pharmacie their conclusions in regard to this subject. They consider Kjeldahl's method, with several modifications, the most rapid and most exact of all known methods. The process as modified by them is based on the following principles:

(1) Total transformation of the urinary nitrogen, and of the organic nitrogen in general into ammonium sulphate.

(2) Oxidation and liberation of this ammoniacal nitrogen by a strongly concentrated alkaline hypobromite solution.

10 cc. urine are introduced into an Erlenmeyer flask, and 5 cc. fuming sulphuric acid added drop by drop; heat just to ebullition, and then add a small globule of mercury; when the foaming has subsided, raise the temperature and continue the boiling until the acid liquid has become entirely decolorized, when the oxidation of the nitrogen is complete. Now allow it to cool, add gradually 20 cc. distilled water and cool under a current of water by the careful addition of soda lye, but not to saturation; if this is indicated by a drop of phenolphthaleine solution, several drops of pure sulphuric acid should at once be added. Now pour the contents of the Erlenmeyer flask into a flask of 50 cc. capacity, and complete the volume

with water which has previously been used to wash the first container; then filter.

Into a graduated tube, closed at one end, containing 20 cc. mercury and 20 cc. of hypobromite solution (prepared by the following formula: bromine, 10 cc.; caustic soda solution, 90 cc., and distilled water, 75 cc.), introduce 10 cc. of the above liquid, which correspond to 2 cc. urine, using a solution of potassium acetate as a separating layer.

When the reaction is finished, place the ureometer into a water vessel, making the levels of the two liquids equal, and note the volume of nitrogen, as well as the temperature and the atmospheric pressure, from which data the weight of nitrogen may be readily calculated; but troublesome calculations may be avoided by using in the manner indicated a solution of 4·714 gm. of pure dry ammonium sulphate in 200 cc. distilled water; 1 cgm. nitrogen is yielded for every 2 cc. of this solution.

The authors have applied this process to substances in which the nitrogen occurs in varied forms. For substances, like the pyridine and quinoleine bases, in which the nitrogen presents great resistance to oxidation by the Kjeldahl method, they use the smallest possible quantity of water. The following table gives some of their results:

Substance.	Found.	Calculated.	Time Consumed. Hr.	Min.
Dry basic quinine sulphate,	7·56	7·50	1	15
Methylamine hydrochlorate,	20·72	20·70	—	20
Cocaine hydrochlorate,	4·145	4·123	2	—
Aniline,	15·35	15·37	2	—
Crystallized eserine,	15·19	15·27	—	30
Saccharin,	7·78	7·65	1	30
Morphine,	4·49	4·62	1	—
Aconitine,	2·09	2·17	1	15
Dry albumin,	15·45	15·53[1]	—	30
Dry wool,	17·06	17·17[1]	—	45
Analgesin,	15·01	16·09	—	—
Pyridine,	15·86	17·7	—	—

[1] According to Dumas.

Analgesin yielded after two hours, 11·88; after three hours, 13·03; and after four hours, 15·01; and pyridine after two hours 14·7, and after four hours, 15·86 nitrogen. In both these substances, the oxidation, even after being continued for a long time, still remains

incomplete. However, judging from the increase in the results, they hope it will not be impossible to surmount the difficulties.—*Jour. de Pharm. et de Chim.*, March, 1893, p. 297.

Estimation of hydrochloric acid in the gastric juice.—S. Mizerski and L. Nencki, in a critical review of the various methods employed for this purpose, consider the colorimetric methods without value in clinical examinations. They have found the chlorometric method of Hayens and Winter (see American Journal of Pharmacy, 1892, p. 241) the most satisfactory, since it permits the estimation of chlorine in all its chemical combinations even when only a small quantity of the gastric juice is operated upon.—*Gaz. Lekarska*, through *Rev. intern. de bibliog. méd.*, March, 1893, p. 100.

Synthetic guaiacol is prepared by Béhal and Choay by dissolving 58 gm. of sodium in 600 gm. methyl alcohol, and adding 270 gm. of pyrocatechin, also previously dissolved in methyl alcohol. The mixture is heated to 120–130° C. with an excess of methyl iodide; allow it to cool and recover the alcohol by distillation. Treat the residue with sodium oxide and agitate the sodic solution with ether to remove a small quantity of veratrol present. The guaiacol is liberated by means of hydrochloric acid, and then distilled. If the portion passing over at 205° to 207° is cooled by means of methyl chloride, the product obtained in crystals consists of pure guaiacol. It is a white, well-crystallized solid, fusible at 28·5° and boiling at 205° C.—*Rép. de Pharm.*, March, 1893, p. 101.

Tropacocaine renders valuable service as a local anæsthetic, according to Dr. Hugenschmidt in *Semaine médicale*. He uses tropacocaine 0·10 gm., and distilled water 2·50 gm., of which preparation ten drops are used for an injection. The advantages of its use as compared with cocaine are, (1) in a dose sufficient for producing anæsthesia it is much less toxic than cocaine, and its action on the vital functions is but little marked; (2) it produces local anæsthesia more rapidly and more profound than cocaine, while it is of an equal duration; (3) the solution of tropacocaine for anæsthetic injections can be preserved for several months by reason of its antiseptic nature, while cocaine shows signs of decomposition and loss of analgesic properties after four or five days.—*Nouv. rem.*, Feb., 1893, p. 56.

Paico.—This name designates, in Chile, the two species *Ambrina ambrosioides* and *A. chilensis*. The parts of the plants employed

are the flowering tops, and their properties are probably due to an amber-colored essential oil, having an aromatic odor, characteristic of *paico*. It is used in the form of an elixir, which is prepared by exhausting 400 gm. of paico with 600 gm. of alcohol of 20 per cent. in a displacement apparatus; filtering and adding 400 gm. of simple syrup; the dose is a tablespoonful before meals. The medicament is exhibited in cases of chronic catarrh of the digestive apparatus.—*Riv. ital. di Ter. e d'Igiene*, through *Rép. de Pharm.*, March, 1893, p. 120.

Benzonaphthol is preferred by M. Huchard, for intestinal antisepsis, to salol or betol, because by its use the often dangerous effects of salicylic acid are avoided; furthermore, it has the advantage of being insoluble and scarcely toxic. The author usually prescribes the following in doses of six to eight cachets per day: Benzonaphthol, 20 gm. and pulverized charcoal, 5 gm., for 30 cachets.—*Rép. de Pharm.*, Feb., 1893, p. 86. (See also AMER. JOUR. PHARM., 1892, p. 77 and p. 517).

Preservation of morphine solutions.—Dissolve one gm. of morphine hydrochlorate in a mixture of 5 gm. of alcohol and 10 gm. of glycerin, then add 15 gm. of distilled water and filter. According to *La Terapia moderna* this solution will keep without alteration for months.—*Rép. de Pharm.*, Feb., 1893, p. 79.

Bismuth and boric acid ointment in the treatment of burns.—Dr. Wertheimer (*Rev. de. méd., de chir., et d' obst.*) has formulated the following for the treatment of burns in children: Bismuth subnitrate, 9 gm.; boric acid, 4·50 gm.; lanolin, 70 gm.; and olive oil, 20 gm. The parts should be washed with warm boric acid water, and then several layers of gauze, spread with the ointment, should be applied. For calming the nervous agitation likely to take place, the author prescribes morphine in the dose of 2 to 4 mgm. and chloral according to the following formula: Chloral, 1 gm.; distilled water, 50 gm.; and syrup of bitter orange peel, 15 gm.—*Bull. gén. de Thér.*, 1893, p. 232.

The use of iodine in the treatment of goitre.—While iodine has long been used in the treatment of this disease, E. Nazaries gives the following new method of its administration, which he claims to have used with unqualified success: Potassium iodide, 5 to 8 gm.; tincture of iodine, 20 to 30 drops; and distilled water, 150 gm. A

spoonful of this should be diluted with half a litre of water, and this quantity taken daily, during and after meals. The author attributes the favorable results of this treatment to the *continued* action of the medicaments taken internally.—*Bull. de la Soc. de Pharm. de Bordeaux*, Feb., 1893, p. 51.

Action of acetic and formic acids on oil of turpentine.—Bouchardat and Oliviero report that by the action of glacial acetic acid on lævogyre oil of turpentine in the cold and at 100°, a complex mixture is formed of lævogyre terpilen, terpilenol acetate ($C_{10}H_{16}C_2H_4O_2$), also the two isomers, borneol acetate and isoborneol acetate. At 150–200° the formation of terpilenol acetate ceases. The presence of water, in various proportions, retards the combination, until, when 25 molecules of water are present, the action ceases entirely. In the other case a partial transformation of terebentene into active isomeric terpilene takes place as is proven by the increase of rotatory power.

The action of *formic acid* differs in being more violent, destroying the rotatory power. In the presence of 1, 3 and 5 molecules of water an abundant formation of free terpin takes place. By this action of formic acid the presence of small quantities of terpin is explained in hydrated volatile oils, which have been kept for a certain length of time, formic acid being invariably present in the volatile oils.—*L'Union Pharm.*, March, 1893, p. 116.

Liquid oxyphenol (*peroxydibenzol*) is obtained by replacing, in a molecule of benzol, $2C_6H_6$, 9 atoms of H by an equivalent of the hydroxyl group; its composition is $C_{12}H_{12}O_6$. Giuseppe Reale ascribes to it remarkable physiological action, and has used it successfully in diabetes and albuminuria. Albumin boiled in water in the presence of a little oxyphenol loses the property of being coagulated by heat.—*Riv. Ital. di Terap. e Ig.*, through *Rev. intern. de bibliog. méd.*, March, 1893, p. 94.

Formulas for eye-washes.—Émile Berger reports to the *Société de biologie*, that by associating several alkaloids, he has obtained a collyrium which is more active and less toxic than when a single alkaloid is used. Thus a mixture of atropine sulphate and duboisine sulphate, of each 0·3 gm.; cocaine hydrochlorate, 2 gm.; and distilled water, 100 gm., yields a mydriatic at least as powerful as atropine in solution 1 to 100, without being equally toxic. The

author gives further, the following two formulas as efficient and well-tolerated preparations for producing myosis, and anæsthesia, respectively:

(I) Eserine sulphate, 1 gm.; pilocarpine hydrochlorate, 2 gm.; and distilled water, 100 gm.

(II) Cocaine hydrochlorate, and pilocarpine hydrochlorate, of each 2 gm.; and distilled water, 100 gm.—*Nouv. rem.*, Feb., 1893, p. 55.

Tonic wine.—Wine of kola, of cinchona, of gentian, of calumba, of each 20 gm.; Fowler's solution, 10 gm.; tincture of nux vomica, 5 gm. A small glassful should be taken twice a day at meal time.

Tonic pills.—Extracts of cinchona and of kola, of each 5 gm.; extract of rhubarb, 2·50 gm.; extract of nux vomica, 0·50 gm.; iron arseniate, 0·30 gm.; and kola powder, sufficient for making 100 pills, of which 4 should be taken per day.—*Monit. de la Phar.*, March, 1893, p. 1242.

Brillantin is a preparation for the hair, for which the *Bullet. de Phar. de Lyon* gives the following three formulas:

(1) Castor oil 6, castile soap 2, benzoin 2, alcohol 200 gm., attar of roses or of neroli sufficient.

(2) Glycerin 10, alcohol 100, rose water 100 gm.

(3) Castor oil 6, glycerin 6, benzoin 2, alcohol 200 gm. Perfume.

ADULTERATED CASTOR AND OLIVE OILS.

By E. J. Parry, B.Sc., and P. A. Estcourt, A.I.C.

During the last six months we have had a large number of samples of castor oil and olive oil sent to us for analysis, and have been surprised to find what a small proportion of them were genuine. Out of fourteen samples of castor oil six were genuine and eight adulterated, and from fourteen samples of olive oil three were pure and eleven adulterated. Any sample of castor oil whose specific gravity does not fall within the limits of ·956 and ·966 should be viewed with grave suspicion, and if it be below ·950 or above ·969 is almost certainly adulterated. The saponification equivalent of pure castor oil—that is, the number of grammes saponified by a litre of normal alkali—should fall between 310 and 320, and the iodine absorption, according to Hübl, falls between 84 and 84·7: our own experiments give 85. As will be seen from Table I, none of the figures contained agreed with these. With regard to the rise in temperature when

mixed with an equal weight of sulphuric acid—that is, 2 volumes of oil to 1 of sulphuric acid (97 per cent.)—our figures do not agree with those recorded by other observers. Allen gives 65° C., Archbutt gives 46° C., and we have repeatedly found 72° to 74° for castor oil of undoubted purity.

TABLE I.

	Specific Gravity.	Saponification Equivalent.	Iodine Absorption.	Temperature Rise.
1, ...	·9735	400	67	60° C.
2, ...	·9721	420	65	62° C.
3, ...	·9723	400	64	63° C.
4, ...	·9740	445	—	60° C.
5, ...	·9766	428	—	62° C.
6, ...	·9752	403	—	61° C.
7, ...	·9739	440	—	60° C.
8, ...	·9719	440	—	62° C.

The usual adulterants of castor oil are poppy seed, cocoanut, lard, rosin and blown oils. The figures above quoted practically exclude all but rosin and blown oils. Moreover, in every case the samples were freely soluble in glacial acetic acid, which is a further indication of the absence of other oils. Since the gravity of blown oil seldom rises above ·970, and its saponification equivalent seldom exceeds 284, we were confident that rosin oil was the adulterant used. The high gravity and saponification equivalent were confirmatory of this, as was the low iodine absorption. And if our observations on pure castor oil were correct, as we certainly believe them to be, in the case of the rise in temperature, the observed rise in the case of the impure samples pointed to the presence of hydrocarbons. To absolutely confirm our suspicions we used three further tests of extreme simplicity, but of great utility. A drop of the oil was placed on the back of the tongue, and in a minute nothing but the disagreeable taste of rosin oil could be detected. The samples did not appear fluorescent in bulk, but when mixed with an equal volume of ether and examined in tubes they were distinctly fluorescent. This is the usual method of observing the fluorescence of oils, but in the case of viscous oils, like castor, we have found the fluorescence much more intense when the sample without admixture with ether is allowed to run down the side of a thin glass tube and the

thin layer adhering to the side is examined. Under these conditions the samples were extremely fluorescent. Finally, a few drops of each sample were dissolved in carbon bisulphide and treated with stannous bromide, with slight excess of bromine. In every case a fine coloration, from deep red to rich purple, was obtained, pure castor oil yielding little or no color. Thus every single sample was clearly proved to be adulterated with rosin oil. By adding absolute alcohol in the proportion of 2 parts to 1 of oil a large portion of rosin oil separated out, and by treatment with slaked lime most of the rosin oil combined loosely with the alkali, and the castor oil when filtered off from the lime compound had a specific gravity of ·9665. By separating the rosin oil out by the addition of alcohol its specific gravity can be taken, and the percentage of rosin oil approximately calculated. However, we found that saponification of the oil with alcoholic potash, evaporating, to drive off the alcohol, and extracting the unsaponifiable matter with ether, was the most direct method of ascertaining the proportion of rosin oil, which we found to range from 35 to 40 per cent.

Before passing on to the samples of impure olive oil, it will be as well to review the results which are obtained from the genuine oil.

The specific gravity is one of the most important features in enabling one to judge of the quality of the oil to be examined. Of many genuine samples examined by us the specific gravity at 15·5° C. (60° F.) compared with water at the same temperature never exceeded ·917. In fact, we have never found so high a gravity. Low densities have been observed, but ·914 is the lowest we have come across, and the sample having this density contained a considerable amount of free acid. The general adulterants of olive oil are cotton-seed, poppy-seed, arachis, sesame, rape and hydrocarbon oils. The addition of any of these oils except rape and the lighter hydrocarbons would tend to increase the density. The saponification equivalent is not of much value in assisting us to detect the adulteration in the oils, the saponification numbers of the oils generally used for sophisticating olive oil being nearly the same as those of the pure oil. If the adulterant were a hydrocarbon oil, or one from a cruciferous plant, the test would be of great value, as in these cases the saponification equivalent would be sensibly higher than those found for pure olive oil.

The observation of the rise of temperature with sulphuric acid is a most important factor, and may be considered to be, if not the most important, one of the most valuable tests of those used to ascertain the genuineness or otherwise of the olive oil submitted for analysis. Pure olive oil, according to many observers, gives 39° to 44°; our own experiments with the pure oil gave 40° to 43°. The usual adulterants of olive oil give much higher figures than these. We found the elaidin test of little value, except, of course, in indicating that the samples were sophisticated; for identification of the adulterant our results were not such as would allow us to pass an opinion as to the oil used for mixing with the olive oil.

The behavior of the samples of oil with glacial acetic acid (E. Valenta, *Dingl. polyt. J.*, cclii, 296; *Jour. Chem. Soc.*, xlvi, 1078) was observed. Equal parts of the oil and glacial acetic acid were mixed and gently heated, with shaking, until the oil dissolved in the acetic acid. Our observations gave for the pure samples we examined 95° C., whilst our figures for the oils suspected of not being genuine were very much lower in every case. The importance of this test can only be appreciated after long and careful trial.

We also used Hübl's iodine absorption method. For pure olive oil Hübl gives 81·6 to 84. Our own experiments gave 81·0 to 84·5 for the pure oil. The figures obtained from the oils commonly used as adulterants are much higher than this, as were the figures we obtained from our samples.

TABLE II.

	Specific Gravity.	Rise of Temperature.	Iodine Absorption.	Saponification Equivalent.	Valenta.
1, ...	·9199	60° C.	100·0	288	68° C.
2, ...	·9182	60° C.	97·5	288	60° C.
3, ...	·9186	60° C.	93·0	286	55° C.
4, ...	·9194	55° C.	98·5	293	55° C.
5, ...	·9190	57° C.	99·0	297	50° C.
6, ...	·9187	65° C.	96·5	288	58° C.
7, ...	·9187	64° C.	97·0	288	55° C.
8, ...	·9188	66° C.	96·0	290	55° C.
9, ...	·9187	64° C.	97·5	290	50° C.
10, ...	·9188	68° C.	96·5	288	54° C.
11, ...	·9187	67° C.	97·5	289	52° C.
Pure oil, . .	·9170	40–43° C.	81–84·5	285–296	95° C.

We applied still another valuable test—that of the melting-point of the fatty acids, obtained after saponifying a quantity of the oil with alcoholic potash, breaking up the soap with sulphuric acid, and washing free from the latter with distilled water. The fatty acids of pure olive oil obtained in this manner we found almost liquid at 23° C., whilst many of the oils before mentioned melted at as high as 35° C.

Our melting-point figures for the oils submitted for analysis were very much higher than those of pure olive, whilst they were slightly lower than those of cotton-seed oil. Our general figures are embodied in Table II.

On examining these figures, we found that the specific gravity, combined with the saponification equivalent, showed the absence of a hydrocarbon oil. The difficulty was now to identify, if possible, the foreign vegetable or fat oil present. Except the saponification figures, no others agreed with those found by us of oils of known purity. Arachis oil of the poorer quality could have been used, the specific gravity of the poorer class being ·920; but we examined for this oil by Renard's test, and were able to say that it was not present. In the same manner sesame oil, on account of its gravity and other general figures, might have been the adulterant, but, carefully using the color-tests, we were able to dismiss it from our minds. We next turned our attention to cotton-seed oil, this oil being one used very largely for the purpose of adulterating olive oil, on account of its pleasant taste and general adaptability for eating and culinary purposes. We found that the high melting-points of the fatty acids of the samples submitted to us agreed well with that of cotton-seed oil, whilst the general color-tests and elaidin tests also confirmed our suspicions.

To further strengthen our opinion that cotton-seed was the adulterant, we carefully prepared the fatty acids of the suspected oils and dissolved them in alcohol, and then, after the addition of nitrate of silver, heated some to the temperature of boiling water. After some little time the silver was much reduced, and much blackening was observed. It may also be remarked that, on heating the fatty acid obtained after saponification for some time at the temperature of boiling water, the characteristic odor of cotton-seed oil was noticed, so that, by a review of these results, we were enabled to return every one of these samples as adulterated with cotton-seed oil.—*The Chemist and Druggist*, April 8, 1893, p. 488.

RESEARCHES ON OPIUM ALKALOIDS.[1]

By T. and H. Smith and Co.

Xanthaline.—This new alkaloid was discovered in our laboratory as far back as 1881, but, owing to various reasons, publication has been deferred until now. It occurs in the acid mother liquids resulting from the crude hydrochlorates of morphine and codeine in the Robertson Gregory process, and is precipitated therefrom, along with narcotine, papaverine, and many impurities, on diluting and carefully neutralizing those liquids.

That precipitate is purified by washing with dilute caustic soda and hot water, and subsequent treatment with weak spirit. The remaining crystals are dissolved in boiling water, with addition of as much hydrochloric acid as is requisite to dissolve three-fourths of them, the remaining fourth being then added, and the whole allowed to boil for some time. After filtration, the insoluble residue is well washed with hot water and again treated with boiling spirit. A considerable portion still remains undissolved, and this is now dissolved in dilute hydrochloric acid and filtered hot. If the liquid be at all concentrated, the filtrate will solidify into a spongy mass of crystals, which, after being freed from the dark liquor, present a similar appearance to narceine, but of bright yellow color. Recrystallization from dilute hydrochloric acid and washing with strong spirit renders the salt of the new alkaloid pure.

The alkaloid itself is readily precipitated from the hydrochlorate by boiling with water, and is left behind as a white powder on heating the hydrochlorate above 100° C. for several hours. From a hot alcoholic solution of the salt, it is thrown down by an alkali as a white crystalline powder, insoluble in water and in alkalies, sparingly soluble in boiling spirit, more easily in benzene, and very easily in chloroform. Its melting point is 206° C. It is a weak base, but forms well-defined salts with mineral acids if these are used in excess, all these salts possessing a more or less intense yellow color. The nitrate is of a bright orange color. In accordance with this very characteristic property of forming yellow salts the name xanthaline (ξανθός = yellow; ἅλς = salt) was chosen for this new alkaloid.

[1] From papers read before the Pharmaceutical Society of Great Britain at the evening meeting in Edinburgh, March 15. Phar. Jour. and Trans., March 25, 1893, p. 793–795.

The following analyses[1] were made, pointing to the formula $C_{37}H_{36}N_2O_9$:

(1) ·322 grm. gave ·8025 grm. CO_2 and ·1655 grm. H_2O.
(2) ·218 grm. gave ·5395 grm. CO_2 and ·1120 grm. H_2O.
(3) ·214 grm. gave ·5328 grm. CO_2 and ·110 grm. H_2O.
(4) ·3705 grm. gave ·9215 grm. CO_2 and ·1815 grm. H_2O.
(5) ·467 grm. gave 16·7 cc. N; B = 758·5 mm.; t = 8°; or ·0201235 grm. N.
(6) ·6135 grm. gave 22·8 cc. N; B = 745 mm.; t = 12·5°; or ·026408 grm. N.

The substance used for Nos. 1, 2 and 5 was identical; for 3 and 6 recrystallized, all dried over vitriol. The substance used for No. 4 was previously heated to 150° C.

XANTHALINE.

	Calculated for		Found.					
	$C_{37}H_{36}N_2O_9$	$C_{36}H_{36}N_2O_9$	1	2	3	4	5	6
C, ...	68·10	67·50	67·97	67·50	67·90	67·83	—	—
H, ...	5·52	5·62	5·71	5·71	5·71	5·44	—	—
N, ...	4·29	4·38	—	—	—	—	4·31	4·31
O, ...	22·09	22·50						
	100·00	100·00						

Hydrochlorate of Xanthaline.—As mentioned above, xanthaline dissolves freely in dilute warm hydrochloric acid, and separates from the bright yellow solution on cooling, in voluminous yellow needles which, after withdrawing the liquid, should be washed with a little cold strong spirit and dried at a very gentle heat. This salt is perfectly stable, but loses weight over vitriol. If heated for some hours to about 150° C., the pure base, free from chlorine, is left. In order to prove the correctness of the formula deducted from the analyses of the base, the hydrochlorate was likewise analyzed.

(1) ·254 grm. burned with chromate of lead and metallic copper gave ·519 grm. CO_2 and ·1355 grm. H_2O.
(2) ·548 grm. gave ·2015 grm. AgCl or ·0498 Cl.

[1] The elementary analyses cited in this paper were kindly carried out by Professor Hermann Ost, of Hanover, then at Leipzig.

(3) ·468 grm. lost on being heated to 160° C., until the weight remained constant, ·086 grm. ($HCl + H_2O$).

	Calculated for $C_{37}H_{36}N_2O_9\ 2HCl+4H_2O$	Calculated for $C_{36}H_{36}N_2O_9\ 2HCl+4H_2O$
C,	55·71	55·03
H,	5·77	5·86
Cl,	8·91	9·04
$H_2O + HCl$,	18·20	18·47

	Found 1	2	3
C,	55·73	—	—
H,	5·93	—	—
Cl,	—	9·1	—
$H_2O + HCl$,	—	—	18·37

Reactions.—Xanthaline dissolves in strong sulphuric acid, with a deep orange color like thebaine. It is not decomposed, however, unless heat be applied, and on standing, or more quickly on addition of water, the dark orange gives way to a pale yellow, and the sulphate of xanthaline crystallizes out in soft yellow needles. This reaction is very striking.

Nitric acid also dissolves xanthaline in the cold without decomposition, and solutions containing a large excess of dilute nitric acid can even be heated to the boiling point without decomposition. The nitrate crystallizes out on cooling in beautiful, shining, orange yellow needles.

Hydroxanthaline.—While xanthaline shows great resistance to oxidizing agents, it is readily attacked by nascent hydrogen. If to the hot solution of the sulphate containing an excess of acid, granulated zinc be added, a violent reaction sets in, following which the yellow color of the liquid is found to have disappeared. On cooling, the liquid almost solidifies into a mass of white crystals, which are a double compound containing zinc and the sulphate of another new base, *hydroxanthaline.*

To separate the latter, the solution is evaporated to dryness and treated with strong boiling alcohol, which takes up very little zinc, but dissolves the sulphate of hydroxanthaline readily. The clear alcoholic solution is evaporated, the resulting crystalline magma pressed and recrystallized. It is very soluble in water, and the base is precipitated from its solution as a resinous-looking body, which quickly solidifies. Recrystallized from weak spirit, it forms hard, white crystals. These melt at 137° C., and are anhydrous.

The following analyses point to the formula:

$$C_{37}H_{38}N_2O_9$$

for the new base.

(1) ·3528 grm. gave ·8734 CO_2 and ·1868 H_2O.
(2) ·3180 grm. gave ·7828 CO_2 and ·1712 H_2O.
(3) ·2402 grm. gave ·5933 CO_2 and ·1280 H_2O.
(4) ·289 grm. gave 11·2 cc. N; B = 753 mm.; t = 15° C. or ·013 grm. N.

HYDROXANTHALINE.

	Calculated for		Found			
	$C_{37}H_{38}N_2O_9$	$C_{36}H_{38}N_2O_9$	1	2	3	4
C, ...	67·89	67·29	67·52	67·14	67·36	—
H, ...	5·81	5·92	5·90	5·98	5·92	—
N, ...	4·28	4·36	—	—	—	4·50

A simultaneous combustion of salicylic acid under the same conditions, furnished the following values:

	Calculated for $C_7H_6O_3$.	Found.
C, ...	60·87	60·72
H, ...	4·35	4·38

There can be no doubt as to the correctness of the formula with the higher carbon for hydroxanthaline. It is nearly insoluble in water, but dissolves very freely in alcohol, benzene and similar solvents. It forms colorless salts which are very soluble but crystallize well. The least trace of this alkaloid at once forms, with strong sulphuric acid, a deep violet solution, which becomes colorless on dilution with water, but is reproduced by adding more acid.

This color test is extremely delicate, and resembles that for cryptopine, with this difference, that with the latter alkaloid a trace of nitric acid is necessary to develop the color, while with hydroxanthaline pure sulphuric acid produces it at once.

Gnoscopine.—This alkaloid, which was discovered in 1878,[1] and to which the formula $C_{34}H_{36}N_2O_{11}$ was then ascribed, has since been obtained in larger quantity, which allowed of its being more closely studied. The hydrochlorate was prepared in an absolutely pure state, and the alkaloid obtained from this pure salt, by precipitation and recrystallization from boiling alcohol, was subjected to analysis.

[1] *Pharm. Journ. and Trans.*, [3], 9, p. 82.

The following results were obtained:

(1) ·5165 grm. gave 1·207 grm. CO_2 and ·260 grm. H_2O.

(2) ·2070 grm. gave ·4835 grm. CO_2 and ·106 grm. H_2O.

(3) ·288 grm. gave ·673 grm. CO_2 and ·1448 grm. H_2O.

(4) ·602 grm. gave 17·8 cc. N; B = 758 mm; t = 8° C.

(5) ·573 grm. gave 17·4 cc. N; B = 752 mm; t = 9° C.

	Calculated for		Found.				
	$C_{22}H_{23}NO_7$	$C_{24}H_{26}N_2O_{11}$	1	2	3	4	5
C, ...	63·93	62·96	63·73	63·70	63·73	—	—
H, ...	5·57	5·56	5·59	5·69	5·57	—	—
N, ...	3·39	4·32	—	—	—	3·56	3·61

The analyses show that gnoscopine is isomeric with narcotine. To make this absolutely certain, a combustion of pure narcotine was made with the following result:

·4125 grm. narcotine gave ·9645 grm. CO_2 and ·2085 grm. H_2O; or, C = 63·77 per cent.; H = 5·62 per cent.

That gnoscopine is a distinctly different alkaloid from narcotine is shown by its melting point, which lies at 228° C., while narcotine melts at 178° C. Further, by its slight solubility in boiling alcohol (the solubility being only about one-tenth of that of narcotine), by the characteristic slender needles in which it is almost entirely deposited from the hot alcoholic solution on cooling, and by its hydrochlorate, which crystallizes with ease from slightly acidified watery solutions in colorless flat prisms of a glassy lustre, whereas the hydrochlorate of narcotine forms hard crusts of white needle-shaped crystals.

The hydrochlorate of gnoscopine readily loses water of crystallization if exposed to the air; when heated to 120° the crystals swell up, leaving the alkaloid as a white spongy mass.

1·26 grm. of air-dry hydrochlorate, but slightly opaque, heated for two hours to 120° C., lost ·225 grm. or 17·86 per cent.

$C_{22}H_{23}NO_7,HCl + 3H_2O$ contain 17·97 per cent. (H_2O + HCl).

On the other hand, gnoscopine and narcotine show identical reactions when treated with sulphuric and nitric acids, and yield the same products of oxidation when gently heated with a mixture of sulphuric acid and manganese peroxide.

The experiment of converting narcotine into isomeric gnoscopine has proved quite successful. When narcotine is heated with glacial acetic acid in a sealed tube to 130° C. for two or three hours, the liquid contents of the tube being then diluted and precipitated by

an alkali, and the resulting precipitate washed with warm water, it is found that after dissolving out with hot spirit the bulk of the unchanged narcotine, a portion, which is much less soluble, remains. This residue, after complete purification, has been proved to be in every respect identical with gnoscopine as prepared from original opium liquids.

OBSERVATIONS ON DECOMPOSING CHLOROFORM.[1]

By David Brown, F.C.S.

At the last meeting of the British Pharmaceutical Conference, I withdrew the zinc iodide and starch test in favor of Professor Ramsay's baryta water one, for the first indications of decomposition in chloroform. The state of decomposition which the chloroform was in at the time the experiments were made justified me in doing so. I now find, however, after carefully watching the decomposition in sunlight from the first indications of it until it has reached a point where no reaction is obtained with zinc iodide and starch, that this reagent deserves the first place as an indicator, the nose the second, and that baryta water may be dispensed with altogether. The chlorine reaction had almost disappeared from the chloroform employed in my previous experiments, which explains how I was led to place baryta water as a test for decomposition in such a false position. It was invariably observed that no reliable reaction with baryta water was obtained until decomposition was unmistakably recognized, both by zinc iodide and starch and by the sense of smell, and, further, that the carbonyl chloride reaction was obtained from samples in the most advanced stages of decomposition.

Soon after zinc iodide and starch begins to indicate, decomposition may easily be recognized by the peculiar odor of carbonyl chloride, which indication renders the application of baryta water, or any other reagent, quite unnecessary for the purpose of establishing the presence of decomposition.

During its first stages a distinct reaction is obtained with zinc iodide and starch, but none with baryta water, a separation of water being also observed. After further decomposition zinc iodide and starch gives a more marked reaction than at first, and baryta water

[1] Read before the Pharmaceutical Society of Great Britain at an evening meeting in Edinburgh, March 15; Phar. Jour. and Trans., March 25, 1893, p. 792.

also reacts, but faintly. Still following the decomposition, it is found that both reagents continue to give marked reactions until a point is reached, when that produced by zinc iodide and starch is observed to become less marked, and finally to disappear altogether, while the reaction with baryta water may still be obtained. A small quantity of deep straw-colored liquid is also observed at this stage floating on the surface of the chloroform.

At this point there remains a considerable quantity of undecomposed chloroform, which may, either before or after separating the decomposition products, be again put into an active state of decomposition by simply removing the stopper from the bottle for a few seconds, replacing it, and again exposing it to sunlight, when reactions similar to those already described with zinc iodide and starch are obtained. This result has been reproduced several times with about a dozen different samples of chloroform.

Results such as I have described could not have been obtained if Professor Ramsay is correct in saying that carbonyl chloride and hydrochloric acid are the only products obtained from chloroform decomposing in the presence of air.

The following equations supply a probable explanation of the changes observed, although they do not explain all the results obtained. No evidence of the presence of carbon tetrachloride having been found in the products is certainly a weak point, but it is well known that chlorine and chloroform, when brought into contact, produce it, and it will be seen from the equations that the conditions necessary for its production exist in the early stages of decomposition.

$$4CHCl_3 + 3O_2 = 4COCl_2 + 2H_2O + 2Cl_2$$
$$2COCl_2 + 2H_2O = 2CO_2 + 4HCl$$
$$2CHCl_3 + 2Cl_2 = 2CCl_4 + 2HCl$$
$$6CHCl_3 + 3O_2 = 2COCl_2 + 2CCl_4 + 2CO_2 + 6HCl$$

In support of this view, chlorine, water and carbonyl chloride are found in the early stages, the chlorine being first recognized, and disappearing with the water at a more advanced stage, and in the carbonyl chloride reaction being invariably obtained, not only in the early but also in the most advanced stage met with.

The time required, the small quantities of products obtained after waiting for months, and the difficulties to be faced in a work's

laboratory when dealing with them led me to give up the idea of attempting to follow up the subject quantitatively, but I am able to say, from the results of work done in this direction, that the quantity of carbonyl chloride found in different samples of decomposing chloroform, although appearing to be very large, judging by the powerful smell and the large volume of vapor evolved, is in fact very small, 0·57 per cent. being the highest amount found, and further that the ratio which exists between it and chlorine precipitable by silver nitrate in the early stages, changes as decomposition advances, the former decreasing and the latter increasing.

In the early stages we find 1 $COCl_2$ to 1·29 HCl.

In the later stages we find 1 $COCl_2$ to 4·69 HCl.

The ratio as represented by the equations in similar stages is 1 to 1 + 1 to 3, the difference being no doubt due to loss of carbonyl chloride.

The straw-colored liquid found in the advanced stages contains no free chlorine; it consists of a strong aqueous solution of hydrochloric acid in which very faint traces of carbonyl chloride are found and contains 35·45 per cent. of HCl.

The presence of this liquid in the advanced stages presents difficulties which cannot at present be satisfactorily explained; it seems highly probable, however, that the hydrochloric acid produced is dissolved in some of the water, which would otherwise have been used in decomposing carbonyl chloride.

The results of an incomplete investigation which have been laid before you do not, in every respect, establish the correctness of the equations given, but they may safely be accepted as representing changes which have been observed during the decomposition of chloroform in the presence of a limited supply of air, and justify the rejection of Prof. Ramsay's baryta water test and the substitution of the zinc iodide and starch one for it.

The chloroform employed was pure, of sp. gr. 1·500, and had been dehydrated with barium oxide.

In the course of these experiments some points were brought out which, although they do not throw further light on the actual changes which take place during decomposition, may be new to some and of interest to others.

Chloroform, such as I have described, has been exposed to sunlight in a Torricellian vacuum for 5 months, equal to 153 hours

sunshine, without change; the same result was observed after 4 months, equal to 106 hours sunshine, when it was exposed in half-filled white glass flasks, hermetically sealed after the air had been expelled by boiling the contents briskly for several minutes. When exposed in white glass stoppered bottles, decomposition had begun in five days, equal to 12½ hours sunshine. These results point to the absence of any oxygenated impurity in the chloroform capable of supplying oxygen for its decomposition, and to the greater stability of chloroform when kept in vacuo.

When a stream of dry oxygen is passed through the chloroform before exposure, decomposition takes place after four hours sunshine. This is interesting in connection with Mr. T. G. H. Nicholson's proposal to introduce an "oxy-chloroform" for the purpose of increasing blood pressure and regulating respiration during its administration, and it suggests the propriety of keeping the two substances apart until they are actually required.

When the sp. gr. is reduced to 1·498 no decomposition had taken place after exposure in white glass stoppered bottles for 144 days, equal to 141 hours sunshine, which confirms the character for stability which chloroform of a reduced sp. gr. has maintained for upwards of thirty years.

ESTIMATION OF THE NITROGENOUS CONSTITUENTS OF COMMERCIAL PEPTONE.[1]

By A. Stutzer.

The value of commercial peptones depends essentially on the amount of albumose and peptone they contain. Gelatin and gelatin-peptone, leucin, tyrosin, and other decomposition products are comparatively valueless. The following process is directed to the estimation of these constituents: In all cases, the amount of any precipitate is not found by weighing, but is calculated from the result of a nitrogen estimation by Kjeldahl's process, on the assumption that they all contain 16 per cent. Of dry preparations 5 grams is taken; of fluids, 20–25 grams. This is warmed with 200 cc. of water, feebly acidified with acetic acid, boiled and filtered, the filtrate being made up to 500 cc. The filter, with the moist precipitate, is

[1] *Zeit. anal. Chem.*, **31**, 501–515; *Jour. Chem. Soc., Abstr.*, 1893, ii, 146.

at once submitted to Kjeldahl's process, and a correction is made for the nitrogen in the paper. This gives the amount of unchanged albuminous substances. In a well made preparation these should not be present. The nitrogen in the filtrate is also determined, and the sum of the two stated as total nitrogen. A fresh portion of substance dissolved in 25 cc. of water (or, if a liquid, 50 cc. concentrated to 25 cc.), is gradually mixed with 250 cc. of absolute alcohol, and filtered after 12 hours. The filtrate, which contains the gelatin-peptone, the leucin, tyrosin, and other decomposition products, is freed from alcohol and dissolved in water. Any insoluble matter is filtered off, and regarded as albumose. The clear solution is made up to 500 cc., and 100 cc. of this, warmed to about 40°, is precipitated with 10–15 cc. of a paste of mercuric oxide, containing about 15 per cent., and prepared by pouring mercuric chloride into dilute soda, washing thoroughly, and preserving in the dark. After stirring for a few minutes, the mixture is filtered and the nitrogen determined in the precipitate and filtrate. The former contains the gelatin-peptone, with unknown decomposition products of albumose and peptone. The filtrate contains the leucin, tyrosin, and other products of a digestive fermentation which has been carried to excess, together with part of the so-called flesh bases (creatin, etc.), which are very sparingly soluble in 95 per cent. alcohol. Instead of mercuric oxide, phosphotungstic acid may be used. This reagent, used in excess, precipitates none of the flesh bases except xanthin and hypoxanthin, of which, from their sparing solubility, only traces can be present in the alcoholic solution.

The alcohol precipitate containing the albumose, gelatin and peptone is rinsed with water into a beaker and warmed until the alcohol is expelled. Any albumose which has been rendered insoluble is filtered off and washed with hot water. The clear solution is made up to 500 cc., and of this, 50 cc., mixed cold with an equal volume of dilute sulphuric acid (1 vol. to 3 vols. of water), is completely precipitated with phosphotungstic acid. The nitrogen in the precipitate gives the joint amount of the albumose, peptone and gelatin. 100 cc. of the same solution, concentrated on the water-bath to 8–10 cc., is mixed with 100 cc. of a cold saturated solution of ammonium sulphate. The precipitate is collected and washed with a saturated solution of ammonium sulphate. It is then dissolved in tepid water, and whilst one portion of the solution is

used for nitrogen estimation, another is precipitated by barium chloride, to ascertain the amount of adhering ammonium sulphate. (The relation of the ammonia to the sulphuric acid in the solution used should be determined, not calculated.) The corrected nitrogen in the precipitate gives the amount of albumose and gelatin. The peptone is known by difference, its actual presence being confirmed by concentrating the remainder of the solution, precipitating the albumose and gelatin by solid ammonium sulphate, and testing the filtrate by adding a trace of cupric sulphate and a large excess of strong soda solution. Peptone gives a characteristic red color.

The gelatin is best estimated by means of the viscosimeter, the viscosity being compared with that of a standard solution of the best white gelatin, to which an equal volume of a 20 per cent. solution of serum peptone, free from gelatin, has been added. A 10 per cent. solution of the substance is prepared and cooled for three hours to a temperature lower than that at which the comparison is to be made. It is then gradually warmed to a standard temperature, and immediately examined for viscosity. Very dilute solutions may be compared at 0–1°, whilst strong ones may need to be warmed to 25°, but it is not permissible to warm above the standard temperature, and again cool just before testing. Calling the viscosity of a 10 per cent. solution of serum peptone 100, the addition of 0·25 per cent. of gelatin raises it to 130 at 0–1°, 114 at 15°, 106 at 20°.

Having now ascertained the amount of nitrogen in the alcohol precipitate in the form of albumose, peptone and gelatin, the remaining nitrogen is to be regarded as belonging to the flesh bases. The principal of these is creatin, with 32·8 per cent. of nitrogen, whence the multiplication of the nitrogen by the factor 3·12, gives the total amount of the bases with but small error.

MINUTES OF THE PHARMACEUTICAL MEETING.

APRIL 25, 1893.

On motion of Prof. Remington, Mr. McIntyre was called to preside. The minutes of the last meeting were read, and no corrections being required, they were approved.

Professor Trimble presented two quarto volumes of Macquer's Dictionary of Chemistry, 1778. It is interesting as a history of the science at that time.

Dr. J. A. McFerran read a paper upon the subject of *compressed tablets*, and gave illustrations with two machines, explaining the methods necessary to obtain success, and showing that nearly every separate substance must be treated in a manner suited to itself to succeed thoroughly.

At the conclusion of the illustrations Professor Remington moved that a hearty vote of thanks be tendered to Dr. McFerran for his paper, and the painstaking manner in which he had illustrated the subject with the machines. This was given unanimously.

Dr. Lowe moved that a committee of three be appointed to take up the subject of compressed tablets and get prescription druggists to give the results of their experience; this was amended by referring it to the Committee on Pharmaceutical Meetings.

Mr. Summers, recently returned from the West Indies, was present and exhibited a number of specimens of interesting drugs, and products of Trinidad and the adjoining islands. The bark of the *lace tree* can be separated into fine layers which resemble very greatly a lace ruffle, its only use is for decorative purposes. *Guava* fruit yields the much esteemed tropical preserve known as guava jelly. *Sapodilla* is a delicious fruit; so is the *Mango* which Mr. Summers thought to be almost a curse in the West Indies, as the laboring classes there, negroes mostly, would not work if they could live without doing so, and as this tree ripens its fruit nearly every month in the year, it can readily be seen that work is not in great favor. The leaves of two plants which flourish in the West Indies, called, respectively, fibre plant, *Agave rigida*, and may pole, *Sanseviera longifolia*, yield valuable fibres; those of the former measuring over 45 inches and those of the latter 48 inches in length; the fibres of the former are much finer and have a soft flaxen feel when handled.

Cacao fruit was exhibited in three varieties, the finest being obtained in Trinidad, growing at elevations varying from 300 to 1,500 feet. These fruits called out quite a discussion, and a number of photographs were exhibited; Mr. Summers proposed to give a fully illustrated talk upon the results and observations made on his recent trip at the opening of the meetings next fall.

A vote of thanks for the very interesting talk was voted to Mr. Summers unanimously.

A formula for *liquor ferri salicylatis* was given in response to a request. The formula given in Remington's practice of pharmacy is modified by adding a portion of glycerin:

℞

Ferrous sulphate, pure, ...	384 grains.
Sodium acetate, ...	320 grains.

dissolve in seven fluidounces of distilled water. Sodium salicylate 480 grains; dissolve in seven fluidounces of distilled water; mix the solutions and wash the filter with sufficient distilled water to make fifteen fluidounces; to this add one fluidounce of glycerin.

The following formula for a somewhat similar preparation named *mistura sodii salicylatis*, originated by Dr. S. Solis Cohen, of this city, is used in the Philadelphia Hospital: Tincture of ferric chloride, 2 fl. oz.; sodium salicylate, 2

troyounces; citric acid, 40 grains; glycerin, 4 fl. ozs.; oil of gaultheria, 120 minims, and solution of ammonium citrate (B. P.), a sufficient quantity to make one pint.

In the American Journal of Pharmacy for 1886, page 534, is republished a formula, taken from Braithwaite's retrospect, an English journal, based upon the same reaction, but results in a much weaker preparation. A proprietary article has also been placed upon the market under the same name.

On motion adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The Junior course closed with the written examinations of the students, held on Thursday, March 9. The following questions were given out during the term:

MATERIA MEDICA AND BOTANY.

(1) Describe a living cell with its contents. Explain the formation of new cells by division.

(2) What is meant by parenchyma tissue? Describe and illustrate by sketches some varieties of parenchyma. Also describe and illustrate different outgrowths of epidermal cells.

(3) What is a bud? At what point of the axis are buds produced? Explain the origin and development in length of the different parts of a bud.

(4) Explain by sketches and brief descriptions the arrangement of tissues as seen upon transverse sections of the following organs: (1) Stem of a monocotyledon; (2) stem of a dicotyledon; (3) root of a monocotyledon.

(5) Give the botanical names of the plants yielding *peppermint* and *spearmint.* State where each species is indigenous. By what characteristics would you distinguish the two drugs? Which yields menthol?

(6) Explain the characteristic structure of the *corolla* and of the *ovary* of the following orders: (1) Aurantiaceæ, (2) myrtaceæ, (3) labiatæ. Name of each of these orders a plant yielding an officinal flower or flower bud.

THEORY AND PRACTICE OF PHARMACY.

(1) Describe the method of taking the specific gravity of a solid body with a specific gravity bottle. Give a definition of specific gravity. State how you would make a fluidounce of a one per cent. solution of cocaine hydrochlorate in water.

(2) What influence has an atmosphere saturated with moisture upon the rapidity with which evaporation takes place, from a liquid placed in a dish in a confined space? Why are flat vessels chosen for pharmaceutical evaporating dishes? Does the degree of heat used in evaporation have any effect in deciding the proper shape of the vessels used in the laboratory for evaporation? Give the reason.

(3) Define the processes of filtration, clarification and decoloration. Write your name, examination number and your idea of the metric measure of the

diameter of the circular piece of filtering paper on your desk; then fold a plaited filter with it, and hand it in with your answers to the pharmacy questions.

(4) Describe three methods of separating immiscible liquids; mention the advantages of each method; illustrate each method with a sketch.

(5) Describe the processes of percolation, repercolation and percolation of sugar in making syrup.

(6) Name two official liquid preparations of ferric sulphate; state how each is prepared, omitting quantities, and give the uses of each.

CHEMISTRY.

(1) How is the fact that the atmosphere has pressure established? Describe the several forms of instruments for recording this pressure. Describe the air-pump and state its uses.

(2) Why does change of condition sometimes result when bodies are heated? What is meant by the latent heat of fusion and of vaporization? State practical applications of these principles.

(3) Describe the electrolysis of water, stating the results as fully as you can. When is an element called electropositive, and when electronegative? Illustrate by example.

(4) Write the reactions for the production of chlorine. Mention experiments illustrating the affinity of chlorine for other elements. Give the correct chemical name for compounds of chlorine with the metals. Give three examples.

(5) Describe the several physical modifications of the element *sulphur.* Under what names is sulphur described in the U. S. Pharmacopœia? What name do we give to compounds of sulphur with the metals? Give examples.

(6) Give the chemical formula of *Acidum Boricum* and *Sodii Boras.* Describe the occurrence of these compounds in nature. How would you proceed to prepare one of these preparations from the other?

EXAMINING COMMITTEE.

(1) State the official names of the two varieties of *rose petals.* Name two or more constituents contained therein. Mention the habitat of each variety. Name an official preparation of each variety.

(2) What is the formula for *sulphur dioxide?* How is it prepared? Give the physical and chemical properties of sulphur dioxide. What official acid is prepared from this oxide? What impurities does this acid frequently contain?

(3) The following ingredients are used in proportions given, in the preparation of official *camphorated tincture of opium*: Powdered opium, benzoic acid, camphor, oil of anise, of each .4 of one per cent.; glycerin, four per cent.; diluted alcohol, sufficient to make one hundred per cent. Write a formula, using metric weights, for fifteen kilograms of the tincture.

(4) Give a brief description of the processes of (1) filtration, (2) precipitation, (3) lotion, (4) expression and (5) percolation. Give the names of five official substances to obtain which the respective operations are employed.

OPERATIVE PHARMACY.

The purification and granulation of ammonium chloride, and the preparation of ointment of nitrate of mercury, and of suppositories of tannin with

cacao butter as the base, and without the use of moulds, constituted the work in this branch.

SPECIMENS.

Anthemis,	Aqua Cinnamomi,	Alumen,
Chondrus,	Extract. Gentianæ Fluid.,	Liquor Sodæ chloratæ,
Sambucus,	Linimentum Chloroformi,	Zinci Sulphas,
	Syrupus Zingiberis.	

The examination of the Senior students commenced March 25, and terminated March 31, 1893. The subjects were as follows:

MATERIA MEDICA AND BOTANY.

A—Pareira brava—State the botanical name of the plant yielding Pareira brava, and its native country. What part of the plant is recognized by the pharmacopœia? Describe the physical and structural characteristics of the drug. What other part of the same plant is sometimes mixed with the drug, and how may it be recognized? Name and describe some of the false Pareiras occasionally seen in the market, and state how they differ from the pharmacopœial drug. What other drugs are procured from the same natural order yielding Pareira, and what are the important constituents of each?

B—Squill—Name the plant yielding Squill, and state its habitat. What part of the plant is used, and how is it prepared for the market? Describe the drug as seen in the market; also its structure. What varieties of the drug are met with, and how do they differ? What causes irritation of the skin on handling squill? Name the medicinally active principles of the drug. Give the medical properties and doses of squill.

C—Willowbark—What plants yield this bark, and where are they indigenous? Give a description of willowbark, as recognized by the pharmacopœia. How does the bark from other parts of the same tree differ from the pharmacopœial willowbark? Give the approximate percentage of its important constituents. Give the outlines of a process for preparing the bitter principle. Also give the chemical characteristics of the latter, its medical properties and dose.

D—Reticulate Leaves—Which pharmacopœial leaves are distinctly reticulate? Give for each of these leaves the name of the plant and the chief constituents. How would you distinguish these leaves, both in the unbroken and broken condition?

E—Arbor vitæ—Name the plant, its habitat and natural order. How may the drug be distinguished from other similar drugs procured from the same order? Name the bitter and astringent principles, also the medical properties and dose of arbor vitæ. Name the plants and parts of plants of the same natural order yielding volatile oils consisting of hydrocarbons.

F—Anise—Give the botanical name, the natural order, and part of the plant used. Describe the appearance of the drug and its structure. Name the impurities occasionally present, including a poisonous drug, and state how they may be distinguished from anise. What amount of volatile oil is obtainable from anise, and what are its characteristic properties? Which tissue or part of star anise yields a similar volatile oil, and how does this differ

from the volatile oil of anise? Name some other drugs yielding volatile oils of similar composition.

G—Quince Seed—Name the plant yielding quince seed, and describe the drug. In what manner is the mucilage stored in the seed? Give the amount of mucilage obtainable from quince seed. Name some other seeds with mucilage stored in a similar manner. Name the pharmacopœial fruits and seeds (besides quince) procured from the order of Rosaceæ, and for each give the name of the parent plant and the main constituents of the drug.

H—Fungi—Name the phamacopœial drugs of the class of Fungi. Describe for each, briefly, its development; also its characteristic appearance, as met with in commerce; and the best method of preservation. Name the supposed medicinally active constituents; and give the medical properties and doses of the drugs.

I—Balsam of Peru and Balsam of Tolu—Give for each of these drugs the name and habitat of the plant; the mode of production (in outline); the characteristic properties; the principal constituents, and tests for detection of impurities.

K—Describe the tests you would apply for distinguishing the following principles:

(1) Quinine and morphine;
(2) Strychnine and brucine;
(3) Resin of scammony and resin of jalap.

How would you detect adulteration of

(4) Powdered tragacanth with starch, and
(5) Powdered acacia with dextrin.

THEORY AND PRACTICE OF PHARMACY.

A—How is official Liquor Acidi Arseniosi made? If Liquor Acidi Arseniosi contains thirty-seven grains of Arsenious Acid in eight fluidounces, what fraction exactly is there in half a fluidrachm? and How many 100 cc. bottles will be required to hold five litres of the above solution?

B—Give the unabbreviated official or Latin name, ingredients, brief outline of process, and a description of the appearance of Norwood's Tincture; Basham's Mixture; Diachylon Plaster; Goulard's Cerate; Plummer's Pills; Elixir of Vitriol; Liver of Sulphur and Labarraque's Solution.

C—Give the English name, ingredients, brief outline of process, and a description of the appearance of Mistura Chloroformi; Liquor Arsenii et Hydrargyri Iodidi; Infusum Digitalis; Syrupus Pruni Virginianæ; Tinctura Cinchonæ Composita; Trochisci Sodii Bicarbonatis; Acidum Nitrohydrochloricum and Vinum Rhei.

D—Describe the processes for preparing Pyroxylin, and Glacial Acetic Acid. Give the official name of each, and state the uses and properties of each.

E—Describe the process for preparing Malt. Describe the changes which take place in the constituents of the grain during the process of malting, and state what produces the changes. How is Extract of Malt made? Describe the appearance and properties of good Extract of Malt.

F—Give three methods of obtaining Glycerin. Which method is preferred? and give reasons. What liquid is used in medicine produced by the action of Nitric Acid on this liquid? In what form is the compound liquid usually prescribed? Give three names that are used in prescriptions for it.

G—What physical properties must a good pill mass possess? Give the reasons for each property mentioned. What is an excipient? Of the following excipients, water, glycerin and mucilage of tragacanth, describe the character of the ingredients of pills for which each excipient is best adapted. Illustrate by an example the use of each.

H—Criticise and correct the following prescriptions, if necessary stating what difficulties there may be in compounding and dispensing them, and how they would be remedied:

	Grm.
℞ Morph. Sulph.,	0.12
Atropia Sulph.,	0.06

M. ch. No. x.
One every three hours.

℞ Chloral hydrat., gr. xl.
Camph. pulv., gr. x.
Syr. Zingib., f℥ ii.
Aquæ ad f℥ ij.
M. ft. solut.

I—Examine the following prescriptions, and, if you would dispense them, state the proper method, explaining the difficulties, if any exist, and how they would be remedied:

℞ Quinin. sulph., gr. xx.
Sodii salicyl., ℥ iss.
Acid. sulph. dil., ℥ i.
Ag. fœniculi, f℥ viij.
M. ft. solutio.

℞ Bismuthi subnit., ℥ i.
Sodii bicarb., gr. xxx.
M. ft. pil. No. xx.
S.—Take one after each meal.

K—Criticise and correct the following prescriptions, if necessary stating what difficulties there may be in compounding and dispensing them, and how they would be remedied:

℞ Pulv. opii, gr. xx.
Dr. J. H.

℞ Quinin. sulph., gr. i.
Morphin. sulph., gr. viij.
Ft. pilul. No. x.
S.—One pill every 3 hours.

CHEMISTRY.

A—Give an outline of the process for manufacturing Sulphuric Acid. How would you purify the commercial acid so as to obtain the *Acidum Sulphuricum, U. S. P.*? What is Nordhausen Sulphuric Acid, and how is it made?

B—Give the formula of *Calx Chlorata* and state how it is made. State how *Potassii Chloras* and *Sodii Chloras* are made. What are the most important pharmaceutical and technical uses of these several compounds?

C—Give the reactions for the production of *Sodii Carbonas* by the Leblanc process. Give the reactions for the production of the same compound by the Ammonia-Soda process. State how Sodium Hydrate is produced by a modification of the Leblanc process.

D—What are the chief ores of Zinc and how is the metal obtained from them? Mention the most important uses of Zinc and of its alloys. Give the names and formulas of the official salts of Zinc.

E—Give the chemical formulas of *Potassii Bichromas* and of *Acidum Chromicum*. State how the latter preparation is obtained from the former. Write the reaction for the reduction of Potassium Bichromate by Oxalic Acid in the presence of Sulphuric Acid. Write the corresponding reaction when free Hydrochloric Acid is used instead of Sulphuric.

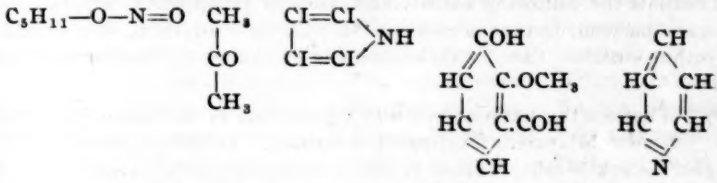
F—Write the graphic formulas of the two isomeric Propyl Alcohols. State the effects of oxidation upon each of these and describe the products of such oxidation.

G—To what class of organic compounds does *Glycerin* belong? From what natural sources is it extracted and by what several methods? Illustrate by reactions. Give the formula and name of the compound obtained by the action of strong Nitric Acid upon it.

H—Give the formula of *Acidum Salicylicum*. State the natural sources of it and how it is prepared from them. Write the reaction for its synthetic formation as now carried out. Give the formulas of Sodium Salicylate and of Salol.

I—Describe the appearance and properties of *Naphthalene* and state the sources from which it is obtained. What are some of the pharmaceutical and technical uses of Naphthalene? Write the graphic formula of β-Naphthol.

K—Give the correct chemical names for the following:



EXAMINING COMMITTEE.

A—What are *Volatile Oils?* Name the two most important classes of volatile oils. Of what two principles do volatile oils proximately consist? What is the most characteristic feature of volatile oils? Describe two methods by which volatile oils may be obtained, with an example of an oil obtained by each process. How may the adulteration of volatile oils by a fixed oil be detected? How may the presence of alcohol be shown? What is the source of *Oil of Origanum?* What is the chemical synonym for *Oil of Gaultheria?* Name a volatile oil produced by chemical action in the presence of water.

B—What is the commercial source of *Ammonium Salts* or Compounds? How is commercial *Ammonium Chloride* purified? How is *Ammonia* Gas made from it? In what two forms is ammonia gas officially recognized? Give the percentage of gas in each preparation. How is *Ammonium Carbonate* made? What is its chemical composition and formula in symbols? What change takes place in the official ammonium carbonate on exposure to air?

C—From what sources are *Tannic* and *Gallic Acids* prepared? What chemical relation exists between gallic and tannic acid? Give an outline of

the process for preparing tannic acid. Give an outline of the process for preparing gallic acid. How can gallic acid be distinguished from tannic acid chemically? How can gallic acid be distinguished from tannic acid microscopically? Name two substances that are incompatible with tannic acid. Name two substances that are incompatible with gallic acid.

D—Calabar Bean. Give the official name. Give the botanical name of the plant yielding it. Where is this plant indigenous? What two names have been given to the active principle of calabar bean? What salt of the active principle is official? What is the dose of this salt? What preparations of Calabar bean are official? What menstruum is used to exhaust the bean? Give the dose of each preparation. What are the medical properties of Calabar bean?

E—Give the process for the preparation of *Solution of Citrate of Potassium.* Give its official title. Why should it be freshly made? Give the process for the preparation of *Neutral Mixture.* Give its official name. To what chemical salt do these preparations owe their activity?

F—Write the reaction of *Ammonium Sulphide* on *Alum.* Write the reaction of ammonium sulphide on *Ferric Chloride.* What is the chemical formula for *Ferric Hydrate?* For what purpose is ferric hydrate used in medicine? Give the physical and chemical differences between ferrous hydrate and ferric hydrate.

G—How many pounds of absolute alcohol are contained in 202′ pounds of alcohol of sp. gr. ·928 at 60° F.? Show *all* figures used in obtaining your answer.

Translate the following Latin terms used in prescription writing: Cola, Cochleare parvum, Dentur tales doses No. vi, Fiat Collyrium, Mica Panis, Q. S., Cyathus vinarius, Fiat Pulvis et divide in chartulas xv, Deaurentur Pilulas, āā, ℞.

H—What are the Latin names and ingredients of the following preparations: Brown Mixture. Turlington's Balsam. Griffiths' Mixture. Black Draught. Black Wash. Yellow Wash. Fowler's Solution. Compound Effervescing Powder. James' Powder. Dewees' Carminative.

I—Copy the following formula, indicating the proper quantity of each ingredient to make two fluidounces of a ten per cent. emulsion of Oil of Turpentine, and one per cent. of Oil of Wintergreen. Explain the manner in which it should be made.

℞ Oleum Terebinthinæ.
Oleum Gaultheriæ.
Pulvis Acaciæ.
Aqua Menthæ Piperitæ.

How would you dispense the following prescription? Give full details of your method of proceeding:

℞ Quin. Sulph., gr. xxx.
Ferri Pulv., gr. xx.
Acidi Arseniosi, gr. ij.
Atropiæ, gr. $\frac{1}{60}$.
Nitro glycerini, $\mathfrak{m}_{\text{LX}}\frac{1}{0}$.

K—Criticise the following prescription. State whether you would compound it. Are the ingredients incompatible? State what action takes place, if any. How would you dispense?

℞ Morph. Sulph., gr. ij.
Potass. Bicarb., gr. xc.
Aquæ q. s. ft. f℥ij.

SIG.—Take a teaspoonful mixed with half a teaspoonful of lemon-juice.

What would be a proper dose for the following prescription? How would you compound it?

℞ Morph. Sulph., gr. viij.
Ac. Sulph., ♏j.
Aq. Dest., f℥ss.
Ol. Menth. Pip.
Ol. Anisi, āā ♏x.
Ac. Hydrocyan. Dil., ♏xlv.
Chloroform., f℥ss.
Spt. Rectificat. q. s. ft. f℥ij.
M. ft. Mist.

SPECIMENS.

Aconitum.	Aq. amygdal. amar.	Ammon. chlorid.	Acid. Gallicum.
Calumba.	Extr. Pruni virg. fl.	Amylum.	Benzoinum.
Colchici semen.	Liq. Ferri tersulph.	Aqua Chlori.	Gentiana.
Cornus.	Massa Hydrargyri.	Liq. Sodæ Chloratæ.	Linim. Chloroformi.
Fœniculum.	Mist. Fer. et Ammon. acet.	Magnes. sulphas.	Magnes. ponderosa.
Rosmarinus.		Potass. bicarbonas.	Pulv. Glycyrrh. comp.
Santalum rubr.	Sodii salicylas.	Potass. chloras.	Pulv. Ipecac. et Opii.
Santonica.	Spir. Æther. nitr.	Potass. nitras.	Sinapis nigra.
Uva Ursi.	Spir. Junip. comp.	Sodii acetas.	Sulphur præcipit.
Xanthoxylum.	Syr. Acidi Hydriod.	Zinci sulphas.	Tinct. Myrrhæ.
	Tinct. Gentianæ comp.		

OPERATIVE PHARMACY.

Granulated Salt.

Benzoic Acid, ... 100 gr.
Sodium Carbonate, Pure, ... 120 gr.

Make Sodium Benzoate, put in a wide-mouth bottle.

Suppositories.

Extract. Stramonii,
Acid Tannic., ... āā gr. vi.
Ol. Theobromæ, ... gr. c.

Make six suppositories by rolling.

Emulsion.

Yolk of One Egg,
Cod Liver Oil,
Water, of each a sufficient quantity.

Make four fluidounces of an emulsion containing fifty per cent. of Cod Liver Oil.

Ointment.

Camphor,	5 gr.
Olive Oil,	1 fl. dr.
Solution of Subacetate Lead,	2 fl. dr.
Cerate,	400 grains.

Plaster.

Spread a Burgundy Pitch Plaster 4 x 6 inches.

ANALYTICAL CHEMISTRY.

The qualitative analysis of various solutions was required, containing several metals in combination with inorganic organic acids.

Ten candidates with the grade "very satisfactory" in materia medica were entitled to participate in the examination of histology, for which the following specimens were used: Cuticle of leaf of Agave, longitudinal section of frond of Aspidium, and the following transverse sections of roots of Cicuta maculata, Smilacina racemosa, Apocynum cannabinum and Stillingia sylvatica; bark of Salix fragilis; fruits of Carum Carui and Chærophyllum procumbens; and seed of Datura Stramonium.

The following list contains the names of the successful candidates entitled to receive the diploma at the annual commencement, and includes the names of those having previously passed the examinations and during the past year completed their terms of service; the titles of the theses presented by the candidates are also appended.

James Duffield Adams, New Jersey, Uranium.
Winfield Scott Adams, Pennsylvania, Cimicifuga.
Frank Alleman, Pennsylvania, Antiseptics.
Frank John Althouse, Pennsylvania, Liquor ammonii acetatis.
Henry Peter Arnold, Pennsylvania, Lac sulphuris.
George Hulings Atkins, Delaware, Rhamnus Purshiana.
Bismarck Henry Balle, South Carolina, Salicylic acid compared with other antiseptics.
Samuel Dey Bennett, New Jersey, Oleum morrhuæ.
Watson J. Berkstresser, Pennsylvania, Ethylic alcohol.
Robert Gillingham Blow, New Jersey, Alkaloids.
Jacob Boadway, Canada, Benzoic acid.
William Frank Bowman, Pennsylvania, Fabiana imbricata.
John Samuel Boyd, Delaware, Ointments.
William Nathaniel Bradley, Pennsylvania, Unguentum aquæ rosæ.
Herman Adam Brickner, New York, Percolation.

Edmund Lee Brown, Missouri, Andromeda ligustrina.
Charles Monroe Butcher, West Virginia, Potassii bitartras.
Albert Reid Calhoun, Pennsylvania, Maltum.
Theodore Campbell, Pennsylvania, Vanilla.
Howard Preston Carpenter, Delaware, My ideal pharmacy.
Charles Robert Carson, Illinois, Camphor.
Herbert Gent Carter, Pennsylvania, Medicated waters, syrups and tinctures.
Albert Arthur Chance, Maryland, Sugar refining.
Simmons Lee Cheek, Alabama, Gossypium.
William Gorgas Clark, Pennsylvania, Abstracts.
William Edward Cline, Pennsylvania, Nux vomica.
Edward Smith Collins, Delaware, Cocaine.
Samuel Harry Conover, Pennsylvania, Pressure percolation.
Harry Thompson Copeland, Pennsylvania, Oleum morrhuæ.
Linwood Shamgar Corson, New Jersey, Aluminium.
Harry Lehman Cox, Pennsylvania, Tinctura zingiberis.
Russell LeVan Coxe, Pennsylvania, Extract of vanilla.
Harry Roscoe Cushen, Maryland, Oil of wintergreen.
Harry Hyman Dancy, North Carolina, Petrolatum.
Frederick Dannenhauer, Pennsylvania, Basham's mixture.
Benjamin Franklin Davis, Pennsylvania, The practical pharmacist.
George Warren Davis, Pennsylvania, Cardamom.
William Lewis Deen, Pennsylvania, Coal tar products in pharmacy.
John Wolfersberger Deininger, Pennsylvania, Phosphorus.
George Ludwig Dengler, Pennsylvania, Tests for tannin.
William Penn Detwiler, Pennsylvania, Aqua ammoniæ.
Harry Daniel Dietrich, Pennsylvania, Maltum.
Charles Schaeffer Donough, Pennsylvania, Phytolaccæ radix.
George Francis Drever, Minnesota, Value of pharmaceutical education.
Luther Albert Driesbach, Pennsylvania, The new antipyretics.
Harry Pickering Eisenhart, Pennsylvania, Sapo.
Paris Foster Elm, Pennsylvania, Cleaning druggists' utensils.
William Wallace Eshbach, Pennsylvania, Taraxacum.
Thomas Addison Fessler, Pennsylvania, Sugar coated pills.
Josiah Hodkinson Furman, Pennsylvania, Spices and their adulterants.
Charles Goos, Pennsylvania, Caffein.
Owen Lovejoy Guest, New Jersey, Lard.
Harry Cornish Hadley, Pennsylvania, Erythroxylon.
Mae Thompson Harders, Pennsylvania, Menstruum for fluid extract menispermum.
Susannah Garrigues Haydock, Pennsylvania, Saccharum.
Franklin Jacob Heckler, Jr., Pennsylvania, Walnut hulls.
William Joseph Heim, Pennsylvania, Cortex sambuci.
Oscar Edwin Henritzy, Pennsylvania, Pills and excipients.
Walter Hayes Hersey, Delaware, Citrine ointment.
Thomas Elwood Hickman, Pennsylvania, Percolation.
William Hilpert, Pennsylvania, Honey.
Samuel Wisler Hinkle, Pennsylvania, Gossypium.
David Hamilton Holcombe, New Jersey, Suppositoria.

Ernest Charles Jaeger, Missouri, The genus Vitis and its chief product.
Rudolph Alexis Kalenborn, Washington, Rhamnus Purshiana.
William Kearns, Pennsylvania, Metric system.
Edgar Cyrus Keefer, Pennsylvania, Suppositoria.
Edwin Russell Kennedy, Ohio, Powdered opium.
Joseph Samuel Kinsey, Ohio, Assayed Erythroxylon Coca.
Harry C. Kirchhoff, New Jersey, Relations of pharmacist and physician.
John Hammond Kirk, Pennsylvania, Aluminium.
Harry Joseph Kline, Pennsylvania, Powdered opium.
Edgar T. Knoop, Ohio, Malt.
Harry Warren Koch, Pennsylvania, Ceratum cantharidis.
David George Kocher, Pennsylvania, Euphorbia pilulifera.
Albert Koenig, Pennsylvania, Bismuth.
Albert Charles Koeppen, South Dakota, Epiphegus virginiana.
Charles Kohler, Pennsylvania, Extent of adulteration and sophistication of drugs.
Abraham Francis Kottcamp, Pennsylvania, Glycerin suppositories.
Ray Weaver Kottka, Pennsylvania, Distillation and its products.
Jerre Ray Kramer, Pennsylvania, Resin of podophyllum.
David Kunkel, Pennsylvania, Pills and excipients.
C. Eugene Lack, Pennsylvania, Hydrargyrum.
Henry Adolph Laessle, Pennsylvania, Euphorbia Ipecacuanha.
William Robinson Lamar, Georgia, The tannin of Krameria triandra.
George Taylor Lambert, Pennsylvania, Alkaloids.
Charles Herbert Lawall, Pennsylvania, Gaultheria.
George Dodson Leh, Pennsylvania, Ointments.
Sylvester W. Leidich, Pennsylvania, Acetanilid and antikamnia.
Louis Leix, Pennsylvania, Syrups by cold percolation.
Max Lippmann, New York, Caulophyllum thalictroides.
Charles Peter Loeper, Pennsylvania, Eucalyptus.
Howard Edgar Long, Pennsylvania, Camphor.
Ivy Forman MacNair, North Carolina, Coca.
Frederick William Meink, Ohio, Analysis of coffee.
Joseph Adolph Meller, Illinois, Tobacco.
Harvey H. Mentzer, Pennsylvania, The antipyretics.
Robert Merrifield, Pennsylvania, Viscum flavescens.
George Franklin Metzger, Pennsylvania, The successful pharmacist.
Louis Joseph Meyers, Pennsylvania, Suppositories.
Byron Amzy Mintonye, Illinois, A pharmacy.
William Joseph Monaghan, Pennsylvania, Kalmia latifolia,
Charles Henry Morris, Pennsylvania, Liquor magnesii citratis.
Harry Kempton Mundorf, Pennsylvania, Compressed pills.
Robert McFarland, Pennsylvania, Stramonii semen.
Raphael McLaughlin, Pennsylvania, Mexican valerian.
Robley Dunglison Newton, Pennsylvania, Iris versicolor.
Albert Spencer Nichols, New York, The history of compressed tablets in America.
Edward John Noon, Pennsylvania, Education in pharmacy.
George Lambert Paullin, New Jersey, Ointments.

Elmer May Paxson, Pennsylvania, Volumetric assay of iodine.
William Edward Peabody, West Virginia, Petroleum.
William Quin Pettyjohn, Illinois, Mercurial ointment.
John Arthur Powders, Pennsylvania, Erythroxylon.
Howard F. Pyfer, Pennsylvania, Cleanliness in pharmacy.
Michael Jenkins Quattlebaum, South Carolina, Chionanthus virginica.
Edward Augustine Reap, Pennsylvania, Lippia mexicana.
Oras Reed, New Jersey, Assay of belladonna.
William Howard Reeser, Pennsylvania, Unguentum aquæ rosæ.
Wayne Schaeffer Regar, Pennsylvania, Balsamum Dipterocarpi.
Jacob H. Rehfuss, Ohio, Suppositories.
Vivian Ivanhoe Reid, Kansas, Triosteum perfoliatum.
Ernest Reif, Pennsylvania, Rosmarinus.
Thomas Jackson Rice, Virginia, Gossypium herbaceum.
William McKinstry Rickert, Pennsylvania, Pills.
Charles Heber Riegel, Pennsylvania, Stramonium.
Louis Robechek, Ohio, Narcissus orientalis.
Rees Conard Roberts, Pennsylvania, Plant fertilization.
William Franklin Robertson, Texas, Gossypium herbaceum.
Otto Moyer Ruete, Iowa, Arnica flowers.
Oscar Gustav Ruge, Illinois, Acetanilid.
John Louis Sahm, Louisiana, Arnica root.
Victor Daniel Scheirer, Pennsylvania, Glycerin and its relation to pharmacy.
Bernhard Frederick Scherer, Pennsylvania, Extractum glycyrrhizæ depuratum.
Charles Franklin, Schmickle, Pennsylvania, Hydrochlorate of cocaine.
George John Schnuerer, Ohio, Cynoglossi folia.
James Ireland Scull, New Jersey, Strontium.
Frank Morris Seiffert, Pennsylvania, Syrups.
Edward C. Sellen, Iowa, Salicylic acid.
William Gooding Shallcross, Maryland, Chloroform.
William Walls Sharp, Delaware, Opium smoking.
John Ware Sheppard, New Jersey, Ancient pharmacy.
Howard Joseph Siegfried, Pennsylvania, Review of a thousand prescriptions.
Robert Wilson Smink, Pennsylvania, Some qualitative analyses.
D. Evans Smith, New Jersey, Petroleum.
Willis Lanius Smyser, Pennsylvania, Squill.
Clara Sprissler, Pennsylvania, Eucalyptus globulus.
Lawrence Albertson Stanger, Pennsylvania, Iron.
Laurence Sylvester Stedem, Ohio, Jambul.
John Wesley Steele, Pennsylvania, Vegetable fibre.
Frederick Eugene Steere, Virginia, Cranberries.
Harry Smoyer Steltz, Pennsylvania, Spiritus ammoniæ aromaticus.
John Stewart, Pennsylvania, Camphora.
James Pennington Stratton, New Jersey, Hydrogen peroxide.
Clement Bryant Stroup, Pennsylvania, Fermentation.
Benjamin Spangler Thompson, Pennsylvania, Prunus virginiana.
Joseph Brinton Thompson, Pennsylvania, Taraxacum.
William Winebert Troop, Pennsylvania, Essential qualifications of a pharmacist.

Elliot Davis Truman, New York, Juglans cinerea.
Harvey Milton Ueberroth, Pennsylvania, Analysis of proprietary headache powders.
Walter Horace Umstead, Ohio, Smilacina racemosa.
Philip Henry Utech, Pennsylvania, Resina sumbul.
Thomas Franklin Van Buskirk, Pennsylvania, Lippia mexicana.
Jacob Harrison Vogelbach, Florida, Serenoa serrulata.
John Kirby Wachtel, Indiana, Erythroxylon.
Charles Wesley Wagner, Pennsylvania, Chocolate.
Harry Hurley Walton, Pennsylvania, Arsenic.
Frank John Walz, Pennsylvania, History of pharmacy.
Frank Nicholas Weber, New Jersey, Boroglyceride.
Ira Randolph Wehler, Pennsylvania, Sunday observance.
Frank Ellison Whitman, Pennsylvania, Saccharum.
Richard Powers Wilkinson, Pennsylvania, Surgical antiseptics.
Herbert Forrest Williams, Pennsylvania, Baptisia.
Julius Wohlgemuth, Pennsylvania, Ipecacuanha.
Benjamin Franklin Wolfenden, Pennsylvania, Fluid extract of pulsatilla.
Charles Adam Zeller, Pennsylvania, How to be a successful pharmacist.
Howard Milton Zimmermann, Pennsylvania, Tinctura opii deodorata.

STATES AND COUNTRIES REPRESENTED BY THE GRADUATING CLASS.

The members of the graduating class came from the following States: 1 each from Alabama, Canada, Florida, Georgia, Indiana, Kansas, Louisiana, Minnesota, South Dakota, Texas and Washington; 2 each from Iowa, Missouri, North Carolina, South Carolina, Virginia and West Virginia; 3 from Maryland; 4 from New York; 5 from Illinois; 6 from Delaware; 9 from Ohio; 14 from New Jersey; 113 from Pennsylvania; total number, 177.

In response to the invitation extended by the faculty, the graduating class and the officers and trustees of the College on the evening of Wednesday, April 19, sat down to the professors' supper in the Museum Hall of the new building, which was handsomely decorated. In the course of the evening, the President of the Zeta Phi Society, Mr. Shallcross, presented to the College, on behalf of the Society, three handsome chairs, which were accepted for the College by Mr. Perot, chairman of the Board of Trustees, and were at once put to use by Professors Maisch, Remington and Sadtler. With brief addresses made by the president, professors and several officers of the College, and by a number of the graduates, the hours passed rapidly, enlivened by songs from the College Glee Club, and this final class reunion terminated to the satisfaction of all present.

Thursday, April 21, was commencement day. A heavy rain-storm continued, with few interruptions, all day, but in spite of the unfavorable conditions of the weather, a large and attentive audience greeted the graduating class in the evening at the Academy of Music. On this occasion seats were provided for the graduates upon the stage, they entering through the parquet at 8 o'clock. President Charles Bullock conferred the degree of Graduate in Pharmacy upon the candidates named above, after which the prizes were awarded.

Honorable mention was made of the following, who had attained the grade distinguished in the final examinations: W. R. Lamar, J. H. Rehfuss and P. Utech; and with the grade meritorious: S. D. Bennett, W. P. Detwiler, R. A. Kalenborn, E. B. Kennedy, G. F. Metzger and R. W. Smink. The materia medica prize, a Zentmayer histological microscope, was presented to W. H. Umstead for histological work done on the subterraneous parts of *Smilacina racemosa* and *Polygonatum biflorum*, and honorable mention was made on similar creditable work by H. A. Laessle. The Analytical Chemistry prize of $25, offered by Professor Trimble for original chemical work, was awarded to F. W. Meink. The John M. Maisch prize of $20, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of plants and drugs, was carried off by W. R. Lamar, and honorable mention was made of S. D. Bennett, W. P. Detwiler, C L. Donough, R. A. Kalenborn, H. H. Koch, E. R. Kennedy, G. F. Metzger, J. H. Rehfuss and P. Utech. The Operative Pharmacy prize of $25, offered by Mr. E. L. Boggs, of Charleston, W. Va, for the best examination in operative pharmacy was awarded to P. F. Elm; the Theoretical Pharmacy prize, a prescription balance, offered by Mr. H. J. Maris, of Philadelphia, for the best examination in theoretical pharmacy, to P. H. Utech, and the Robinson prize, a gold medal and certificate offered by Jas. S. Robinson, Ph.G., of Memphis, Tenn., for the best examination in both general and analytical chemistry, to W. R. Lamar.

The valedictory address to the graduating class, delivered by Prof. J. P. Remington, was replete with sound advice and happy suggestions. As usual, the exercises of the evening were enlivened with music, Hassler's orchestra having been engaged for the evening, and at the close the graduates proceeded to the green room, where the flowers and other presents sent by friends of the graduates had been collected together, and were distributed to those for whom they were intended. For some years past, we have noted the rapid decline of the former interest in the custom of distributing such presents in public, and its cessation has now been attained.

It should be placed on record yet, that the invitation cards gotten up by the Zeta Phi Society for this commencement were exceedingly elaborate and artistically executed in five leaves held together by blue and white silk ribbons, and showing engravings of the new College building, invitation to the Alumni reception on Tuesday, invitation to the commencement on Thursday, portraits of Professors Maisch, Remington, Sadtler and Trimble, and the names of the class officers alongside of a representation of the colossal statue of William Penn, which, for some months, has been on exhibition in the court-yard of the Public Buildings, and there during a night of the preceding winter was decorated with the College colors by two members of the present graduating class.

Alumni Association Philadelphia College of Pharmacy.—On the evening of April 17, a reception was given to the graduates of former years and their friends in the Museum Hall of the new College Building, with the view of inspecting the improvements made during the past year. The exercises were opened by some introductory remarks by C. Carroll Meyer, Class '73, the president of the Association, who was followed by the chairman of the Committee on Arrangements, J. W. England, cl. 1883, whose remarks related to "our association, its origin and work." Short addresses on the subjects named

were afterward made as follows: "Our College," by Ch. Bullock, cl. 1847, president of the College; "our graduates as legislators," by G. W. Kennedy, cl. 1869, member of the legislature of Pennsylvania; "our graduates as professors," by Prof. J. P. Remington, cl. 1866; "our graduates as physicians," by Dr. A. W. Miller, cl. 1862; "our graduates as manufacturers," by Benj. F. Fairchild, cl. 1872, now of New York; "our graduates as pharmaceutical journalists," by Caswell A. Mayo, cl. 1887, editor of the American Druggist, and "our graduates in State Associations," by Jos. L. Lemberger, cl. 1854, treasurer of the Pennsylvania Pharmaceutical Association since its organization in 1879. After a few remarks by two or three other speakers, the company was invited to proceed to the large examination room on the fifth floor, where light refreshments had been provided, and opportunity was offered for friendly conversation.

The annual meeting of the Alumni Association was held in Alumni Hall, in the new College building, April 18, when after the transaction of routine and other business the following officers were elected: president, David H. Ross, cl. 1878; vice-president, Wm. L. Cliffe, cl. 1884, and J. S. Beetem, cl. 1878; treasurer, E. C. Jones, cl. 1864; secretary, Wm. E. Krewson, cl. 1869; corresponding secretary, Dr. J. L. D. Morison, cl. 1888; trustee of the sinking fund, Thos. S. Wiegand, cl. 1844; members of the executive board—Wallace Procter, cl. 1872; C. C. Meyer, cl. 1873; W. A. Bullock, cl. 1886; H. L. Stiles, cl. 1885, and Jos. C. Perry, cl. 1891, the latter to serve for an unexpired term of two years.

The reception to the Graduating Class took place in Association Hall on the evening of April 18, when the certificates of membership were presented to the newly elected members. Wm. R. Lamar, Augusta, Ga., was the recipient of the Alumni Gold Medal, awarded for highest average in general examination, and certificates were presented for best examination in one branch to J. H. Rehfuss, Eaton, O., in materia medica; P. H. Utech, Meadville, Pa., in theoretical pharmacy; G. J. Schnuerer, Cleveland, O., in chemistry; G. F. Metzger, Bethlehem, Pa., in general pharmacy; P. F. Elm, Shippensburgh, Pa., in operative pharmacy; E. R. Kennedy, Zanesville, O., in analytical chemistry, and J. S. Kinsey, New Philadelphia, O., in specimens. R. L. Lloyd, Philadelphia, was awarded a certificate for the best collection of indigenous plants; Chas. C. Manger, Boonville, Mo., one for best examination in junior class, and Herman Harms, Salt Lake City, Utah, a special certificate for meritorious examination, especially in materia medica.

The class oration was delivered by Howard F. Pyfer, Lancaster, Pa.; the history of the class was delineated by E. R. Kennedy, Zanesville, O., and its future predicted by G. L. Paullin, Shiloh, N. J. Certificates for microscopic work were awarded to C. S. Donough, W. R. Lamar, H. R. Hess, H. Harms, J. A. Meller, O. M. Ruete, J. Kenworthy, H. T. Thayer, J. L. Sahm, J. W. Sheppard, G. J. Schnuerer and J. S. Kinsey.

Maryland College of Pharmacy.—The forty-first annual commencement was held on the afternoon of Friday, April 21, at Harris' Academy of Music, Baltimore, when President Louis Dohme conferred the degree of Graduate in Pharmacy upon the following candidates: Fred. Andriessen, Maryland; Harvey G. Beck,* Pennsylvania; Charles M. Benson, Maryland; Frederick J. Boerner, Maryland; Albert J. Bossyns, New York; J. Edward Broadbelt, Jr., Maryland;

Louis Burger, Maryland; Charles McG. Cowan, Tennessee; William F. Dunn, Delaware; William Duvall, Maryland; David R. Evans, Louisiana; John Virgil Eubanks, North Carolina; Edward Thomas Hargrave,* Virginia; Howard M. Harrod, Maryland; Eugene Withers Hodson, Maryland; Alexander Kammer, Maryland; George Keene, Maryland; Albert E. Kilner, England, John J. Keene, Maryland; William Leffler, Maryland; Richard C. McCleary; Maryland; Alphonse McLaughlin, North Carolina; Jacob Lee Mayer, Maryland; Walker Moore, Alabama; Francis Joseph Powers, Maryland; Thomas Reed, Texas; John J. Remsburg, Maryland; Harry A. Reindollar, Maryland; Henry Schmidt, Maryland; George Henry Schwinn,* Maryland; James R. Stafford, Texas; Quevenne Jerome Stout, Tennessee; James Pinkney Stowe,* North Carolina; J. Harry Stutt, Maryland; Thomas H. Wildsmith, Pennsylvania; George Arthur Wilford, Pennsylvania; J. Warren Wills, Virginia; Harry L. Whittle, Virginia.

Prizes consisting of gold medals were awarded to those marked (*), Mr. Beck receiving two such prizes. The junior class gold medal was carried off by W. B. Carpenter. Rev. J. E. Grammer, D.D., delivered an address to the graduates.

Notice of the commencements of the following schools of Pharmacy has been received:

Albany College.—March 12, in Germain Hall, with seventeen graduates.

Atlanta College.—March 3, in De Give's Opera House, with four graduates.

Brooklyn College.—May 2, at Young Men's Christian Association Hall.

Buffalo University.—May 2, in Music Hall, with twenty-one graduates.

Chicago College.—April 13, in Hooley's Theatre, forty-six graduates.

Cleveland.—Eleven graduates.

New York College.—April 26, at Carnegie Music Hall, one hundred and five graduates.

Northwestern University.—February 16, with forty-one graduates.

Purdue University.—March 14, at the University Hall.

St. Louis College.—April 20, at Memorial Hall, forty six graduates.

EDITORIAL.

The Seventh International Pharmaceutical Congress.—The officers of the American Pharmaceutical Association have recently sent out invitations to participate in the deliberations of this Congress, enclosing at same time the announcement of object, organization and program, as finally prepared by the Committee appointed at the Profile House in July last. This announcement is as follows:

(1) The International Pharmaceutical Congress called to convene in Chicago, August 21, 1893, during the progress of the World's Columbian Exposition, will be the seventh in the series of International Pharmaceutical Congresses, and the first held in America.

In addition to the invitation extended by the American Pharmaceutical Association to the International Pharmaceutical Congress to hold its next meeting in 1893 in Chicago, a proposal was also made by the World's Congress Auxiliary of the World's Columbian Exposition to the pharmacists of the

world, inviting them to participate in the Columbian commemoration by a convention similar in scope to the other world's congresses to be held at the same time and place, the proceedings of which will, in part, be devoted to addresses and papers of a general and popular character, including brief reviews of the progress made since the days of Columbus. It was, however, deemed desirable that there shall be but one pharmaceutical congress held this year, and that the scope and objects of the proposed World's Congress of Pharmacists and those of the Seventh International Pharmaceutical Congress be merged, and to attain this end the World's Congress Auxiliary accordingly proposed that the programme of the International Pharmaceutical Congress at Chicago include addresses and papers of a historical nature, and afford opportunity for the presentation of such other topics of a general interest as may, in the judgment of the Committee on Arrangements, be appropriate to the occasion. This proposal having been agreed to, the International Pharmaceutical Congress will be the only world's congress of pharmacists held in Chicago during the Exposition season.

The general scope and objects of the International Pharmaceutical Congress will be to stimulate pharmaceutical progress, to discuss the status of pharmacists and promote an intelligent appreciation of the work they do, and to consider matters and measures affecting the further advancement of pharmacy and a nearer approach to international agreement in education and practice.

(2) A Committee on the International Pharmaceutical Congress, has been appointed by the American Pharmaceutical Association to arrange the preliminaries. This Committee on Arrangements consists of Oscar Oldberg, Chicago, Chairman; N. Gray Bartlett, Chicago; C. Lewis Diehl, Louisville, Ky.; D. R. Dyche, Chicago; Albert E. Ebert, Chicago; C. T. P. Fennel, Cincinnati, O.; J. M. Good, St. Louis, Mo.; C. S. N. Hallberg, Chicago; L. C. Hogan, Chicago; J. N. Hurty, Indianapolis, Ind.; J. Kochan, Denver, Col.; E. Kremers, Madison, Wis.; A. L. Metz, New Orleans, La.; Charles Mohr, Mobile, Ala.; E L. Patch, Boston, Mass.; A. B. Prescott, Ann Arbor, Mich., Charles Rice, New York, N. Y.; E. H. Sargent, Chicago; William Saunders, Ottawa, Can.; L. E. Sayre, Lawrence, Kan.; William M. Searby, San Francisco, Cal.; William Simon, Baltimore, Md.; William Simpson, Raleigh, N. C.; William S. Thompson, Washington, D. C.; together with Joseph P. Remington, Philadelphia, Pa., President of the American Pharmaceutical Association, and John M. Maisch, Philadelphia, Pa., Permanent Secretary of the American Pharmaceutical Association.

All who intend to participate in the Congress or to be represented or present in its meetings, and all invited guests, are requested to communicate in advance, and, if possible before July 1, their names and addresses to Oscar Oldberg, Chairman of the Committee, 2421 Dearborn Street, Chicago.

All papers, reports, and communications to be read at the Congress will, as far as possible, be printed in advance, in order that copies may be distributed at the meeting. For this purpose, such papers, reports, and communications must be placed in the hands of the Permanent Secretary of the American Pharmaceutical Association, John M. Maisch, 145 N. 10th Street, Philadelphia, before July 20. If received later, the printing in advance of the meeting cannot be promised.

(3) The Congress will be constituted of delegates accredited for that purpose

by the governments of the different countries, the pharmaceutical societies and examining boards, the colleges and schools of pharmacy, the pharmaceutical departments of universities, and the national pharmacopœial committees or commissions, respectively, each of which bodies will be entitled to be represented by three delegates.

(4) Special invitations are extended to pharmaceutical teachers, authors, leaders in the pharmaceutical profession, and pharmacists generally, to seats in the Congress.

(5) When a vote shall be taken upon any question upon which the yeas and nays shall be called, only duly accredited delegates shall be entitled to vote.

(6) The officers of the Congress shall consist of a President, Vice-President, a Secretary, and three Vice-Secretaries. The Committee on Arrangements shall act as a nominating Committee, and shall nominate the officers by ballot. The number of Vice-Presidents to be nominated shall be determined by the Nominating Committee.

(7) The first session of the Congress will be opened at 9 o'clock A.M., on Monday, the 21st day of August, 1893, in the Memorial Art Palace, Chicago, in which commodious halls and accommodations have been placed at the disposal of the Congress through the courtesy of the World's Congress Auxiliary of the World's Columbian Exposition.

The Congress will be opened with appropriate ceremonies, official addresses of welcome, and a report of the Committee on Arrangements. A temporary organization will then be effected and a Committee on Credentials appointed.

Following this will come the adoption of regulations for the government of the Congress and its proceedings, and the reception of official communications and invitations.

The Nominating Committee will then report the nominations for officers, after which the election of officers will follow.

(8) The proceedings of the Congress will be conducted in the English language; but, when participants in discussions speak in German, French, Spanish or Swedish, interpreters will translate these languages into English. Addresses, papers, or communications printed or published by the Congress will be published in English, German, French and Spanish.

The publication of the Proceedings will be intrusted to a special committee, to be appointed by the President of the Congress.

To defray the expenses attendant upon such publication, each member from the United States or member of the American Pharmaceutical Association who may take part in the Congress will be required to pay the sum of five dollars; no assessment to be made upon other members or visitors.

(9) To facilitate the conduct of the proceedings of the Congress, the Committee on Arrangements will classify the business according to the subjects, and the Congress will for that purpose be arranged into four sections, as follows:

Section I. Historical and Ethical Pharmacy.

Section II. Pharmaceutical Education and Legislation.

Section III. Pharmacopœial Matters.

Section IV. General Section, embracing pharmaceutical questions and subjects not assignable to any of the three preceding sections.

The order of business after the election of officers will be in conformity with this classification.

Subjects Proposed for Papers, Reports and Discussion.

SECTION I.—HISTORICAL AND ETHICAL PHARMACY.

(1) The condition of pharmacy four centuries ago as contrasted with its present status.

(2) The history of pharmacy and pharmaceutical institutions in the United States.

(3) The ethics of the practice of pharmacy, and the mutual relations between physician and pharmacist, and between pharmacists and the public.

(4) The influence exerted upon the practice of pharmacy by the introduction of chemicals and other medicinal substances controlled or limited by patents, copyrights, trade-marks, or other legal restrictions, but which are commonly ordered by physicians in their prescriptions.

Should such limitations as foster monopoly in the manufacture and sale of such products be removed in the interest of the public good?

(5) The relations of pharmacists to public sanitation.

(6) Statistics of the present number of pharmacies in proportion to population in various countries, and of imports and exports of crude drugs, medicinal chemicals, and pharmaceutical preparations during the last half-century.

SECTION II.—PHARMACEUTICAL EDUCATION AND LEGISLATION.

(1) Statistics giving the number of schools or colleges of pharmacy in each country, and the total number of students pursuing pharmaceutical courses.

(2) How do the education and the professional and social position of pharmacists compare with those of other professions?

(3) What legislation, if any, is at present most needed for the advancement of the best interests of pharmacy?

(4) To what extent is official supervision of drug-stores necessary or beneficial?

SECTION III.—PHARMACOPŒIAL QUESTIONS.

(1) The proper scope of a national pharmacopœia.

(2) What improvements, if any, are desirable and practicable in pharmacopœial nomenclature? Is a nearer approach to international uniformity possible?

(3) What would be an ideal pharmacopœia?

(4) What progress has been made towards the preparation of an international pharmacopœia for potent remedies?

What action, if any, should be taken in reference to this subject?

(5) Have the influence and co-operation of pharmacists increased in the work of pharmacopœial revision in the various countries? What proportion of the membership of the pharmacopœial revision committee or commission of your country consists of pharmacists?

(6) Should any substance, the manufacture or sale of which is restricted by any patent, copyright, or trade-mark, be admitted into any national pharmacopœia? If so, under what conditions?

(7) What consideration should determine the introduction into the Pharmacopœia of a new remedy, or the retention or rejection of one already in it?

SECTION IV.—GENERAL SECTION.

(1) Upon what general plan can a systematic pharmaceutical nomenclature of the complex organic chemicals recently being introduced into the Materia Medica (such as antipyrine, etc.) be constructed?

(2) In what directions may the pharmacist profitably extend his technical and professional work to render him less dependent upon the purely mercantile part of his business?

Papers upon these and other subjects which may be presented and accepted will be referred to their appropriate Sections.

The American Pharmaceutical Association will hold its forty-first annual meeting in Memorial Art Palace, Chicago, commencing Monday, August 14 next, one week preceding the meeting of the Seventh International Pharmaceutical Congress. An elaborate circular has been prepared by the local Secretary, and several weeks ago mailed to all members and others interested. There can be no doubt that at the time when these meetings are to be held, visitors to the World's Columbian Exposition will be very numerous, and it may not be an easy matter to then secure suitable accommodations readily. In his circular the local secretary has directed special attention to this matter, and it will be well for those, intending to visit Chicago about that time, to bear in mind that accommodations should be secured in advance, and that the labors of the local secretary for securing such will be much facilitated by promptly applying to him, stating time, number of persons, accommodations desired, etc. The Bureau of Public Comfort, which is under the control of the directors of the Exposition, will co-operate with the local secretary in making satisfactory provision for visitors and participants to both the meetings referred to above. Obviously, those making early application are likely to be suited more promptly than those delaying until near the time of meeting. All communications relating to these matters should be addressed to Mr. Henry Biroth, Local Secretary, Am. Phar. Assoc. and Ill. Phar. Assoc., Rooms 1111–1113 Schiller Building, 103–109 Randolph Street, Chicago, Ill.

Attention to Medical Men at the World's Fair.—The Joint Committee of the Chicago Medical Profession on World's Fair Entertainment has delegated the establishment of a Bureau of Information and Service, with approval and endorsement to Chas. Truax, Greene & Co., the Committee reserving to itself the duty of such social entertainment of visiting physicians during the continuance of the Exposition, as may seem desirable. On application of the Practitioners' Club and the South Side Medical Club, the matter of social entertainment was delegated to them, with full authority to act in the capacity of entertaining bodies, with the retention of the Chairman and its American and Foreign secretaries already appointed, as follows:

Chairman, Dr. Chas. Warrington Earle; *American Secretaries*, Dr. Archibald Church, Dr. Geo. Henry Cleveland, Dr. John C. Cook, Dr. J. C. Culbertson; *British*, Dr. Sanger Brown; *German*, Dr. F. C. Hotz; *French*, Dr. Fernand Henrotin; *Spanish*, Dr. E. J. Gardiner; *Italian*, Dr. A. Lagario; *Swedish*, Dr. K. Sandberg; *Canadian*, Dr. R. D. McArthur.

The Eleventh International Medical Congress will meet in the city of Rome, Italy, September 24 to October 1 next, and transact its scientific labors in 19 sections, meeting simultaneously and each electing its own officers, while the

general sessions of this Congress, whose officers will be announced at the opening session, are reserved for the consideration of the Congress and of its common interests, and for addresses and communications of general interest and importance. Papers and communications intended for the Congress must be announced before June 30; and of each a brief abstract, containing the conclusions, must be sent to the Committee not later than July 31. These abstracts will be printed and distributed to the members by authority of the president. But the manuscripts of all addresses, papers and communications must be handed to the secretary before the close of the meeting; and a special committee on publication will decide which or what part of them shall be published in the Transactions of the Congress. Fifteen minutes are allowed for the reading of a paper, and in the discussions five minutes for each speaker, who can take the floor but once on the same subject; for closing the discussions the author of a paper is allowed ten minutes. Members who participated in the discussions are required to hand to the secretaries their remarks in writing. The official languages of the sessions are Italian, French, English and German, and the programs and daily bulletins will be published in these four languages; during the meetings, however, a member may be permitted to use, for a brief remark, any other language, provided some member present expresses a willingness to translate such remarks into one of the official languages.

During the continuance of the Congress an *International Exhibition of Medicine and Hygiene* will be inaugurated in Rome; it will be in charge of a special committee, of which Prof. L. Pagliani, Ministère de l' Interieur, Rome, is the president.

For the transatlantic voyage, both ways, the North German Lloyd and the Hamburg-American Packet Co. offer a reduction of 25 per cent., and the Compagnie générale transatlantique a similar reduction.

Chairman of the American National Committee for this Congress is Dr. A. Jacobi, 110 West 34th Str., New York.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Urines chyleuses et hémato-chyleuses.—Définition; caractères physiques; recherches et dosage des graisses, des albuminoides, du sang, etc.; analyse microscopic (recherche des parasites, etc.); diagnostic et pronostic urologiques; mécanism pathogénique. Par A. J. Zune, rédacteur en chef du "Moniteur du praticien." Paris: chez l'auteur, 108 bis rue de rennes. 1893. 8vo. Pp. 82. Prix, 4 francs.

Chylous and hemato-chylous urines: definition, physical characters; detection and estimation of fats, albuminoids, blood, etc.; microscopic analysis (detection of the parasites); urological diagnosis and prognosis; pathogenic mechanism.

The title-page explains in a measure the scope of the work. The definition of the diseases under consideration is given in the introduction. The author then discusses the remaining subjects in five chapters, beginning with the physical characteristics, subdivided into general considerations, color, consistence, opacity, odor, fluorescence, viscosity, volume, density, reaction. polarimetric deviation and suspended matters. As an illustration the changes

occurring in these physical characters during a period of about four months are given in tabular form. After noting the qualitative tests, the various processes recommended for the quantitative determination of the morbid constituents are described, and these are further characterized by determining and estimating for the fats the different fat acids, for the albuminoids the globulin, myosin, urocasein, mucin, serin, paralbumin, hemialbumin, hemialbuminose, peptones, etc. Other constituents, like cholesterin, lecithin, etc., have not been neglected. Chapter III is devoted to the microscopic examination of these urines, the different animalculæ, in some cases with their ova, observed in different countries, being described and illustrated upon four plates. The last two chapters discuss the diagnosis, prognosis and pathogenesis of chyluria. The importance of the work will readily be seen from the above brief analysis of its contents, particularly when it is considered, that the literature on the subject has been well utilized, and supplemented by many observations and researches made by the author.

Chemical Papers from the Research Laboratory, Pharmaceutical Society of Great Britain. Edited by Wyndham R. Dunstan, M.A., Professor of Chemistry to the Pharmaceutical Laboratory and Director of the Research Laboratory. Vol. I. London, 1892. 8vo. Pp. 232.

The volume contains reprints of papers which have been previously reported to the Pharmaceutical Society, Royal Society, Chemical Society and Physical Society, and which describe the results of the chief chemical investigations carried on in the research laboratory during the preceding three years. The experimental work in six of the papers had not been made at the same laboratory; but the inquiries described—medical, crystallographical, botanical, etc.—were suggested by the chemical investigations, and the two series of the papers had been published simultaneously. A number of these papers have been transferred, wholly or in abstract, to previous volumes of this journal.

Proceedings of the ninth annual convention of the Association of Official Agricultural Chemists, held at the National Museum, Washington, D. C., August 25–27, 1892. Edited by Harvey W. Wiley, Secretary of the Association. Published by authority of the Secretary of Agriculture. Washington: Government Printing-Office. 1892. 8vo. Pp. xvii and 243.

This is Bulletin No. 35 of the Division of Chemistry, U. S. Department of Agriculture.

Proceedings of the National Wholesale Druggists' Association in convention at Montreal, Canada, Windsor Hotel, September 19–22, 1892. Minneapolis: L. Kimball Printing Company. 1892. 8vo. Pp. 319.

The frontispiece of the volume is the phototype portrait of J. E. Davis, of Detroit, president for the current year.

Carl Wilhelm Scheele, Pharmacist and Chemist. A brief account of his life and work. London, Pharmaceutical Society of Great Britain. 1893. Pp. 24.

Reprint from the Pharmaceutical Journal of January 14.

Annus Pharmaceuticus. 1891. Pp. 48.

Annus Pharmaceuticus. 1892. Pp. 48.

The two pamphlets which are reprints from the Pharmaceutical Journal of January 2 and of December 31, 1892, give brief reviews of pharmaceutical matters and work done during the years stated in Great Britain and elsewhere.

Caffeine and the Question of its Isomerism. By Albert B. Prescott, M.D. Pp. 15.

Reprint from the Journal of the American Medical Association, Jan. 28, 1893.

Indische Fragmente. Strychnos Nux vomica. Von A. Tschirch.

Ueber das Jodtrichlorid. (Iodine trichloride.) Von E. Tavel und A. Tschirch.

Ueber das spektroskopische Verhalten des Blutes nach Aufnahme von schädlichen Gasen, und eine Methode diese Veränderungen für gerichtliche Zwecke objectiv zur Darstellung zu bringen. Von Gustav Bieder.

On the spectroscopic behavior of blood after the absorption of deleterious gases, and a method to exhibit these changes for forensic purposes.

Proceedings of the American Pharmaceutical Association, at the fortieth annual meeting, held at Profile House, N. H., July, 1892. Also the constitution, by-laws and roll of members. Philadelphia: Published by the American Pharmaceutical Association. 1892. 8vo. Pp. xxiv and 1212.

The present volume contains from 400 to 500 pages more than those which preceded it for a number of years. The pamphlet edition of the minutes and papers read have been in the hands of the members for some months. The Report on the Progress of Pharmacy covers 700 pages, is very comprehensive, and the abstracts are quite replete. The price for this volume, bound in cloth, was fixed at $5.50 a copy, free of postage—the same as several of the preceding volumes—under the impression that it would not materially exceed them in size. This low price remains as announced, and the volume is also included in the sets, which are sold at large discounts from the prices of single volumes.

A slight change has been made in the date of the next annual meeting, which will begin in Chicago, on Monday, August 14 (instead of Tuesday, August 15, as previously announced), at 3 P.M. The local Secretary, Mr. Henry Biroth has already issued a circular, announcing the date, and giving other particulars. Those intending to be present at the meeting, or at that of the International Pharmaceutical Congress, which convenes on the Monday following, may obtain particulars in regard to the securing of rooms and other matters, by addressing the local Secretary, rooms 1111–1113 Schiller Building, 103-109 Randolph Street, Chicago, Ill.

Studien ueber die Guttapercha. Von Otto Oesterle.

The preceding four essays are reprints from Archiv der Pharmacie, and were communicated by Professor A. Tschirch.

Die italienische Pharmakopöe. Von Dr. Bruno Hirsch. Pp. 28.

A review of the new Italian pharmacopœia, reprinted from Phar. Centralhalle.

Papoid Digestion. By R. H. Chittenden, Professor of Physiological Chemistry in Yale University. Pp. 36.

Reprint from Transactions of the Connecticut Academy, vol. ix.

Piperazin in the treatment of Stone in the Kidney. Report of cases. By David D. Stewart, M.D., Lecturer on Clinical Medicine in the Jefferson Medical College. Pp. 9.

Reprint from Therapeutic Gazette, January 16, 1893.

An Outline of the Technique of Abdominal and Pelvic Operations, as performed in the Medico-Chirurgical Hospital, of Philadelphia. By Professor Wm. Easterly Ashton, M.D.

Reprint from the Medical Bulletin, January, 1893, with illustrations.

An historic Pharmacy. By Joseph Hatton.

Reprint from the English Illustrated Magazine, December, 1892, in the Chemist and Druggist, January 23, 1893, with illustrations. The pamphlet refers to the establishment of Allen & Hanburys.

The Bicycle in its Relation to the Physician. By Seneca Egbert, A.M., M.D., Lecturer on Hygiene, Drexel Institute, Philadelphia. Pp. 11.

Reprint from the University Medical Magazine, November, 1892.

The Calendar of the Pharmaceutical Society of Great Britain. London, 1893. Pp. 555. Price, two shillings.

The Society was founded in 1841, incorporated by Royal Charter 1843, and confirmed and enlarged by acts of Parliament 1852, 1868 and 1869. The publication contains the charter pharmacy act and amendments, by laws, lists of officers, members, honorary and corresponding members, associates and students, regulations of the benevolent fund, donations to the same, extracts from various laws, applying more or less directly to pharmacy, and various other matters of interest.

Modern Homœopathy, its absurdities and inconsistencies. By Wm. W. Browning, A.B., LL.B., M.D., Lecturer upon and Demonstrator of Anatomy. Long Island College Hospital, etc. Pp. 37.

This essay was awarded the prize of $100, offered by Dr. Geo. M. Gould, of Philadelphia, and is designed for distribution by physicians in order to disseminate more enlightened views upon the subject of which it treats. The author illustrates the "absurdities" in a clear and convincing manner, and quotes largely from homœopathic writers to prove the inconsistencies of the system and its lack of scientific foundation.

History of the Life of D. Hayes Agnew, M.D., LL.D. By J. Howe Adams, M.D. Pp. 376. With fourteen full-page portraits and other illustrations. Price, extra cloth, bevelled edges, $2.50; half morocco, gilt top, $3.50. The F. A. Davis Co., publishers. Philadelphia, 1892. Large 8vo. (Sold only by subscription.)

A handsome volume and a biography full of interest, and written with evident love and veneration. Dr. Agnew himself had left among his papers but little material available for the history of his life; through the efforts of Mrs. Agnew and of his numerous friends, dates and facts and documents were supplied. Born in 1818, he entered the medical department of the University of Pennsylvania in 1836, graduated in 1838, and then went to Nobleville, now Christiana, Pa., to assist his father in his medical practice. After some years he moved to Philadelphia, where in 1852 he took charge of the School of Anatomy on Chart Street, was called to the chair of surgery of the University of Pennsylvania in 1871, resigned in 1889, and died March 22, 1892. Between these dates there lies a life of honest toil and of marked achievement, which is well depicted in the book before us. "One point in Dr. Agnew's character," says his biographer, "which strikes most forcibly, is the fact that he had but

few qualities considered in this day to be necessary to success. Young men are admonished that the way to be successful is to be grasping, selfish and pushing, and insensibly they grow up with the idea of each man for himself; but here was a man who achieved success in life by a diametrically opposite course. He was modest, retiring, kind, gentle and devoid of all ambition. Truth was the object of his search; he endeavored to ascertain the facts and draw the right inferences; justice was the bed-rock of his character."

OBITUARY.

Alphonse Louis Pierre Pyrame De Candolle, professor of botany and director of the botanic garden at Geneva, Switzerland, died in that city April 5 last, in the eighty-seventh year of his age. He was the son of the celebrated botanist, Augustin Pyrame De Candolle, and was born in Paris, France, October 28, 1806. The father having, in 1816, accepted a call as professor of botany to Geneva, Alphonse completed his education at the university named, studying jurisprudence, and also botany, the latter science with such success that already in 1830 he published a monograph on the campanulaceæ, and in 1832 on the anonaceæ, which works were followed in 1835 by his "Introduction à l' étude de la botanique." In 1834 he succeeded his father in the professorship, and after the latter's death in 1841 continued, with the aid of other botanists, the publication of the large work "Prodromus systematis naturalis regni vegetabilis" (complete in 21 volumes). Among his other famous works may be mentioned "Géographie botanique raisonné" (1855), "Histoire des sciences et des savants depuis deux siècles" (1873), "Origine des plantes cultivées" (1883), and "Monographiæ phanerogamarum prodromi nunc continuatio nunc reviso" (1878 to 1881); the last-named work was issued with the collaboration of his son Casimir Pyrame.

Constanz S. Manz, died April 19, 1892, in Lyons, Ia., where he was born March 1, 1860. His father being a pharmacist, he learned the business under him, and some time after graduating from the Philadelphia College of Pharmacy in 1881, succeeded his father in business. He left a widow and two sons.

William Arthur Haas, of South Easton, Pa., a promising senior student at the Philadelphia College of Pharmacy, died at his home in March. The Zeta Phi Society adopted, March 25, the following resolutions:

WHEREAS, It has pleased Almighty God in his infinite wisdom to remove from our midst our fellow class-mate William Haas;

Resolved, That we do most sincerely miss him and mourn his loss, and that we feel that pharmacy has lost one of its most promising students.

Resolved, That a record of his death be put on the minutes of the society, and that a letter of condolence be sent to his bereaved parents.

Resolved, That these resolutions be published in the American Journal of Pharmacy, the daily papers and in the Alumni Report.

HOWARD F. PYFER,
ROBERT W. SMINK,
HARRY R. PARVIN,
Committee.